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GEOLOGICAL STRUCTURE AROUND THE CROWN PILLAR AT SELBAIE MINE, QUEBEC

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GEOLOGICAL STRUCTURE AROUND THE CROWN PILLAR AT SELBAIE MINE, QUEBEC

by

B. Arjang*

ABSTRACT

A detailed survey of discontinuity orientation, spacing, trace length and observable surface characteristics has been carried out around the crown pillar of Selbaie Mine, in Northwest Quebec. In the near-surface mining excavations on 55, 60 and 70 levels the hanging wall, orebody and footwall exposures were mapped in scanlines with a total length of about 655 m.

Analysis of 725 measurements of structural discontinuities and weakness planes showed the following results:

Geologic Location		Mean orientation (Dip direction/Dip) / Spacing per set (m) Set A	Set B	Set C	Mean-Spacing (m)	Discontinuity Termination Index (%) 0.5-2.0m	2.0-3.6m	>3.6m
HANGING WALL		096°/64° / 1.50	204°/46° / 6 ?	002°/18° / 4.28	0.71	19.05	52.38	28.57
OREBODY	N**	107°/54° / 1.17	140°/66° / 2.17	-	0.72	11.56	77.46	10.98
	S**	180°/70° / 2.47	140°/78° / 3.01	303°/20° / 10.05	0.59			
FOOTWALL	N	170°/80° / 1.44	144°/76° / 2.38	154°/14° / 10.06	0.76	15.53	71.37	15.10
	S	202°/75° / 2.08	162°/80° / 2.51	296°/19° / 4.18	0.76			

** Regarding the structural features, the investigation site has been divided on strike into the North and South sections.

Three discontinuity sets (steeply dipping sets A, B and sub-horizontal set C) and main fault or fault zone, variable in thickness and infilling, on the contact of the footwall/orebody were the most prominent structural features in the investigation site.

The observable surface characteristics of discontinuities were

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determined as: 70% indicate various stages of alteration and coating or infilling, 80% of structural weakness planes occurred as rough to very rough, irregular or undulating, the planar structure were observed dominantly as continuous planes. Evidence of past water flow on discontinuity surfaces indicates that weakness planes occurred with apertures ranging in order of up to a few millimeters.

The variability in the pattern of structural discontinuities indicated that the effect of alteration increases from north to south and is highest in the extreme south on the orebody.

STRUCTURE GÉOLOGIQUE AUTOUR DU STOT DE LA MINE SELBAIE, AU QUÉBEC

par

B. Arjang*

RÉSUMÉ

On a étudié en détail la direction, l'espacement, la longueur de la trace et les caractéristiques directement visibles de discontinuités qui se trouvent autour du stot de la mine Selbaie, dans le Nord-Ouest du Québec. Dans les puits peu profonds aux niveaux 55, 60 et 70, le toit, le gisement de minerai et le mur ont été cartographiés par bandes d'une longueur totale de quelque 655 m.

Voici les résultats de 725 mesures effectuées sur des discontinuités et des plans de faiblesse structuraux.

Emplacement géologique	Direction moyenne (direction du pendage/pendage) Espacement, par série (en m) Série A	Série B	Série C	Espacement moyen (en m)	Indice de longueur des discontinuités (en %) 0,5-2 m	2-3,6 m	> 3,6 m
TOIT	096°/64° / 1.50	204°/46° / 6 ?	002°/18° / 4.28	0.71	19.05	52.38	28.57
N**	107°/54° / 1.17	140°/66° / 2.17	-	0.72			
GISEMENT DE MINERAI					11.56	77.46	10.98
S**	180°/70° / 2.47	140°/78° / 3.01	303°/20° / 10.05	0.59			
N	170°/80° / 1.44	144°/76° / 2.38	154°/14° / 10.06	0.76			
MUR					15.53	71.37	15.10
S	202°/75° / 2.08	162°/80° / 2.51	296°/19° / 4.18	0.76			

** En ce qui concerne les éléments structuraux, le terrain à l'étude a été divisé le long de la ligne de faille en sections nord et sud.

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Trois séries de discontinuités (les séries A et B, à fort pendage, et la série C, presque horizontale) et une faille principale, ou zone de failles dont l'épaisseur et le degré de remplissage varient au contact du mur ou du gisement de minerai, constituent les éléments structuraux qui ont retenu l'attention.

En ce qui concerne les caractéristiques directement visibles, on a constaté que 70 % des discontinuités présentaient des degrés divers d'altération et de revêtement ou de remplissage, que 80 % des plans de faiblesse structuraux étaient irréguliers ou onduleux ou allaient du rugueux au très rugueux et que les structures planes se trouvaient surtout dans les plans continus. Des traces d'anciens écoulements d'eau sur les surfaces de discontinuité indiquent que des orifices pouvant aller jusqu'à quelques millimètres ont accompagné la formation des plans de faiblesse.

La variabilité de la configuration des discontinuités structurales indique que l'altération se fait sentir davantage vers le sud pour atteindre son point culminant à l'extrémité sud du gisement.

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INTRODUCTION

Engineering geological survey is a requirement for mine site investigations and provides essential background information for detailed rock mechanics studies. It is important that the results of structural investigations and the data from rock mass characterization are made available at an early stage so that the relevant decisions can be made on mining method, layout and support requirements.

At the Selbaie Mine, as a part of CANMET's rock mass characterization project, mapping of discontinuities orientation, spacing, trace length and the observable characteristics of discontinuities was conducted for a preliminary characterization of the rock mass. For the final classification of the rock mass some additional data are required which will be compiled in the near future.

The present study concentrates around the near-surface crown pillar on 55 and 70 levels in the South and 60 level in the North section of the mine, which were up to 70 m below ground surface within 10 to 25 m below bedrock surface.

A total length of about 655 m drift and crosscut exposures were mapped along the scanlines resulting in the measurements of 725 discontinuities. Related to the mine situation and the geologic structural condition, the description of data followed a modified version of DISCODAT Field Guide which provides procedures for determination of engineering geological parameters (1).

GEOLOGICAL SETTING

The Selbaie Mine, a sub-surface hard rock mine is located about 95 km West of Matagami in Northwestern Quebec (Fig. 1). This base metal (cu-Zn-Ag-Au) deposit is within Chibougamau - Matagami section of the Abitibi Orogenic

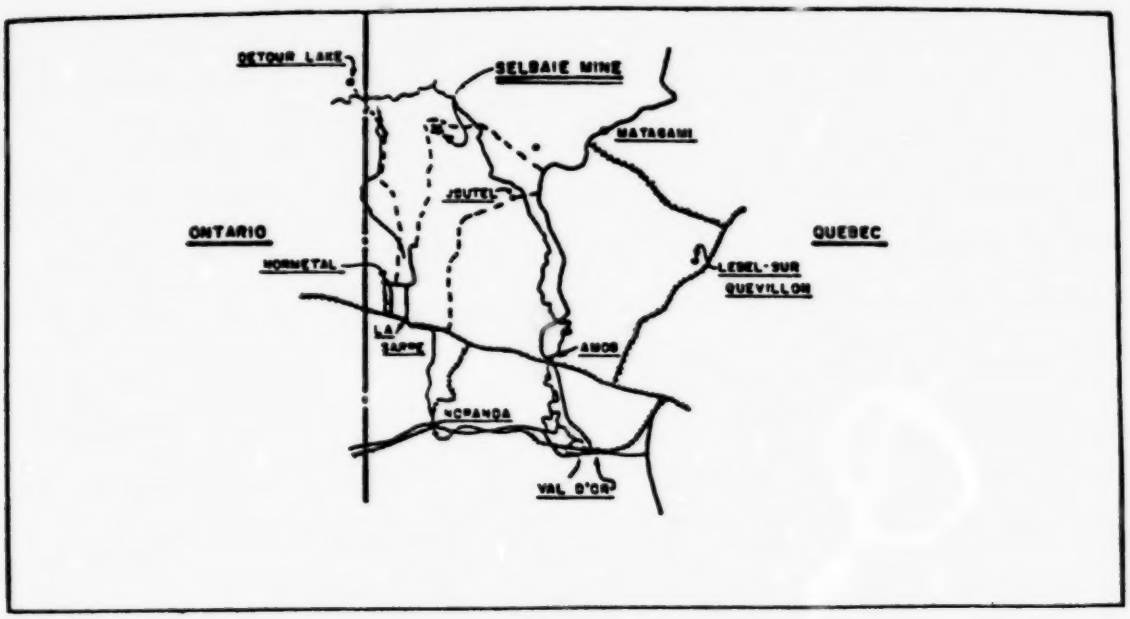

Fig. 1 - The location of the Selbaie Mine

belt, a part of the Superior Structural Province (2). The geologic setting of the Selbaie deposit reflects a complex history of intermittent faulting and extrusive activity.

The Selbaie Mine comprises various lenticular orebodies probably associated with the fault zone on the footwall/orebody contact, which appear to be the most prominent structural features. The ore zone (B zone, No. 1 vein) is contained in dacites or dacitic rocks (dacitic tuff, dacitic quartz eye, tuff lapilli and welded acitic tuff) and has general N-S strike and a dip of 40-50° East. The horizontal extension of the ore zone is about 500 m with a vertical depth exceeding 180 m below surface. The width ranges from 2 to 43 m and is generally narrower on the North section of the mine.

Bedrock surrounding the deposit is covered by glacial till and sand to a depth of up to 50 m. In some locations the ore zone rock is altered and/or bleached due to Kaolinization of feldspar.

SURVEY OF GEOLOGICAL DISCONTINUITIES

At the Selbaie Mine for detailed structural mapping, the scanlines were set up from some reference point on the exposed face in drifts or cross-cuts and served as reference for the surveying of data. The location of scanlines are shown in Fig. 2 and 3 and a description is given in the mapping sheets in Appendix A. The information recorded on each discontinuity which actually intersects and those which may intersect when projected toward the scanline is as follows:

- Using the scanline technique (3), discontinuity position and spacing were measured by setting up a measuring tape across the rock exposure and noting the tape position where discontinuities were present.
- Orientation as a dip direction and the dip angle of discontinuities were measured with a geological compass.
- Continuity or trace length, where each discontinuity is placed in one of four size categories, depending on whether or not it has continuity across the exposure in both the vertical and/or horizontal direction or an equivalent distance. Because the height of excavations was about 3.60 m the sample size was truncated at that height.
- Infilling material the discontinuity opening or coating on discontinuity surfaces is recorded using symbols.
- Water occurrence or moisture on discontinuity surfaces were distinguished using codes.
- Estimation of surface characteristics of discontinuities rock wall such as degrees of weathering and variations of roughness.

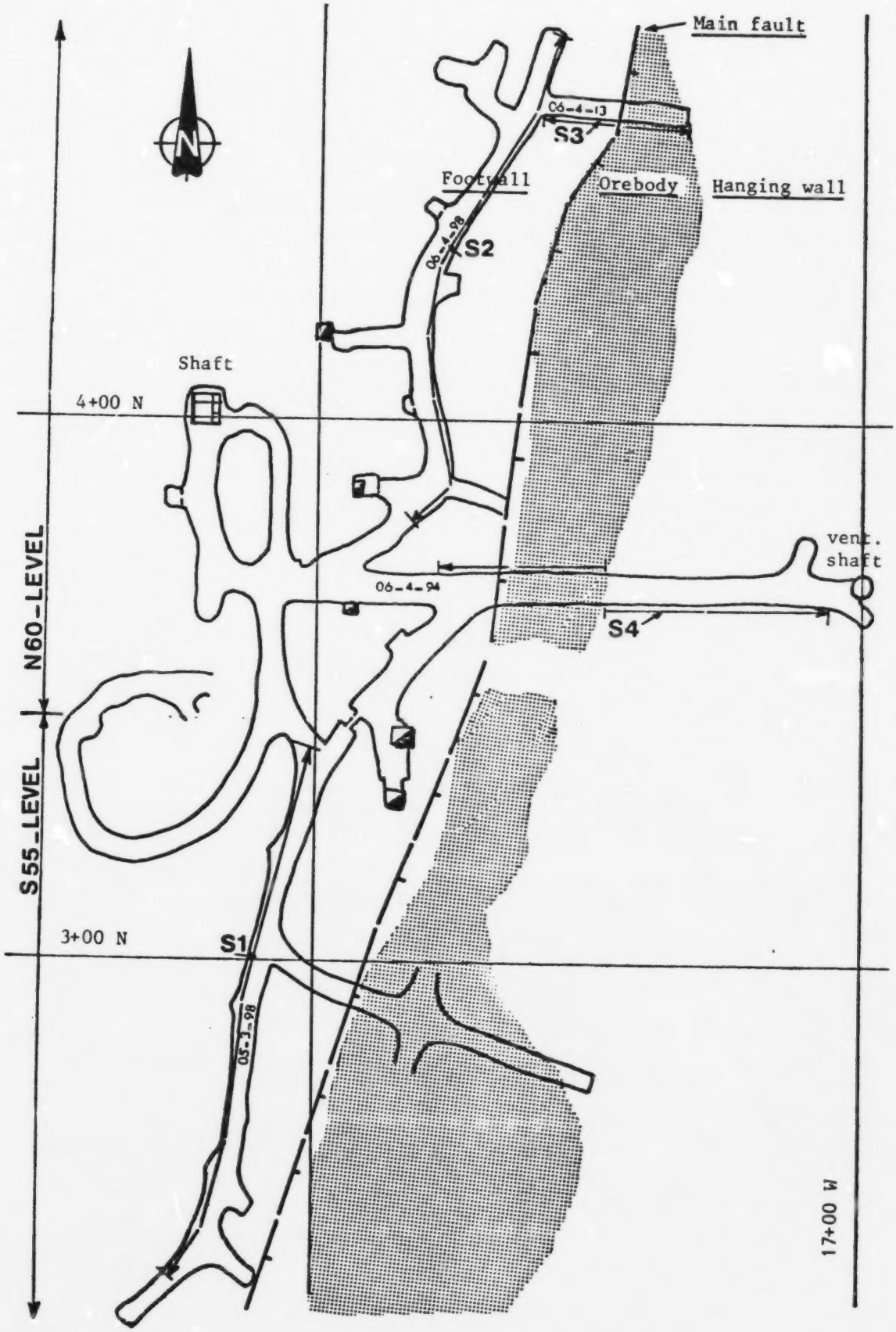

Fig. 2 - Mine layout of S55 and N60 levels, S_1 - S_4 scanlines on footwall, orebody and hanging wall.

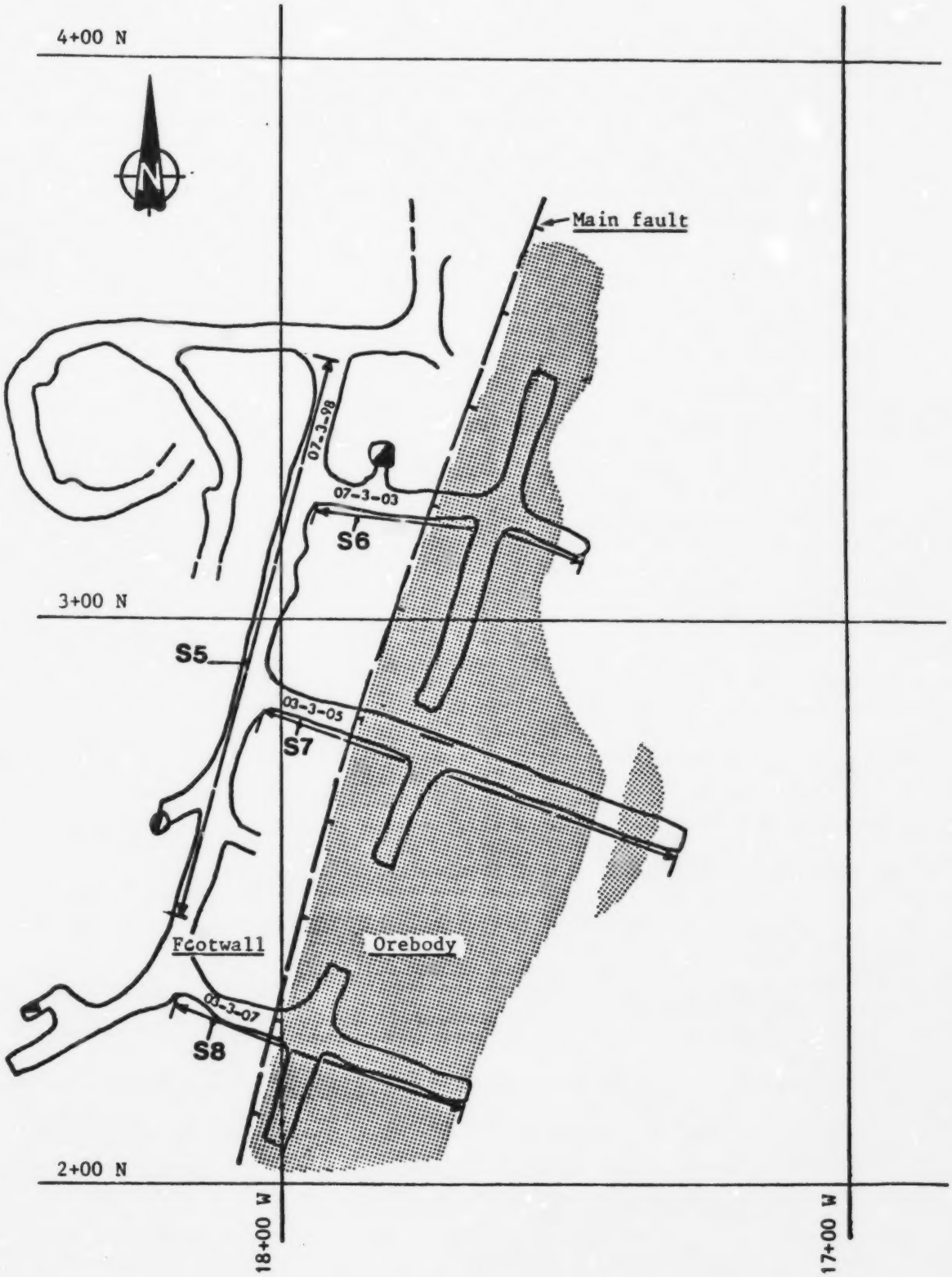

Fig. 3 - Mine layout of S70 level; S5 - S8 scanlines on footwall and orebody.

In addition to this information on discontinuities other information such as rock type and compressive strength of discontinuity wall rocks were estimated.

The following comments can be made on the survey procedure: Whenever possible, equal length of scanlines were established.

In the survey procedures on underground excavations, the trace length or size of discontinuities can actually be divided into two categories comprising those definitely greater than excavation height and those with smaller than that height.

To obtain the preferential orientation of multiple discontinuity sets, all natural discontinuities encountered in the survey with trace length exceeding 0.50 m have to be recorded, not just those which are representative of a particular part of the excavation wall. Experience has shown that small scale fractures (≅ 0.50 m) are usually difficult to distinguish from mining induced or blasting fractures.

Consideration has also been given to structures crossing the rock exposures in a sub-perpendicular direction, which could be recorded more frequently and those which lie parallel to the scanline or some sub-horizontal discontinuities with large extent forming the excavation roof.

Finally, consideration has to be given to parameters which may influence the results of structural survey (4), and to avoid magnetic compass errors caused by mining equipment, rock bolts or air ducts (5).

DISCONTINUITY CHARACTERISTICS

ORIENTATION

The orientation* of 725 discontinuities, such as joints and faults,

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* Determination of discontinuity orientation consists of dip direction and dip angle in degrees. All measurements were related to the Mine North, being 22.67° east of True North, and used throughout this report.

was measured. The results were plotted on Equal-Area Nets representing the lower hemisphere and reproduced on 7 stereograms, Fig. 4 to 10.

An inspection of discontinuity concentrations on stereograms indicates, with a few exceptions, relative consistency of spatial distribution of major structural planes. In general, the regional trend is well defined. On the stereograms the pole density maxima lying in NW to NNE quadrant, on the periphery, and in the SE quadrant in a sub-horizontal position can be identified.

Three discontinuity concentrations were distinguished and considered as the dominant sets A, B and C in the investigation site. The discontinuity sets A and B were northeast to easterly oriented, dipping steeply toward east and/or south. The sub-horizontal discontinuity set C occurred also as a northeasterly oriented structure, but dipping to the west-northwest, compared to the steeply dipping set A and B.

A comparison of North and South sections indicates some 30° of changes in the orientation of dominant sets in the footwall and orebody. Thus, in the North section the northeasterly structures were predominant.

Discontinuities in the orebody showed considerably more scatter in orientation than in the footwall and hanging wall*.

The spatial distribution of fault planes in the investigation site is shown in Fig. 10. Their orientation corresponds with the mean orientation of dominant sets in the hanging wall, orebody and footwall. The trend of northerly oriented faults, dipping 50° to 70° to the east, associated with the main fault on the contact footwall/orebody is well defined. Two minor

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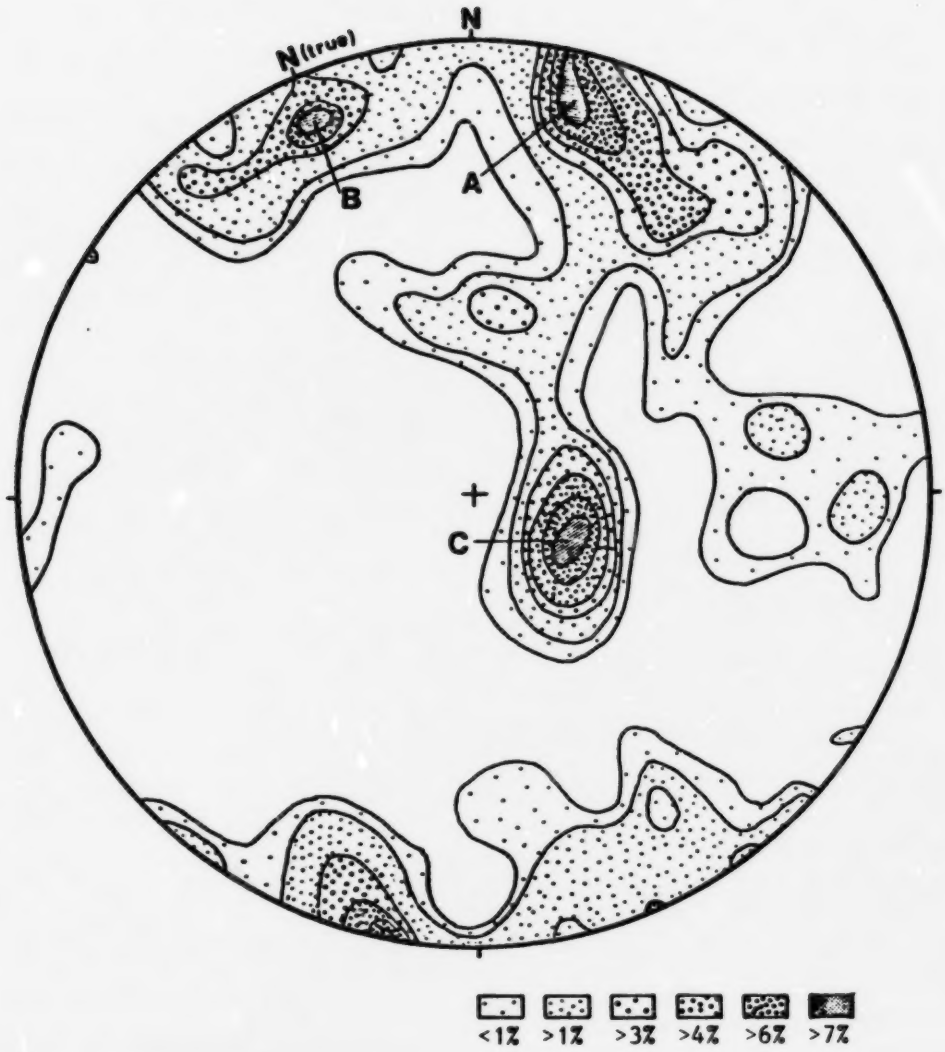
* The information in the hanging wall is limited, and the number of observations appear not to be sufficient to define the true structural features at the investigation site. Except in the northern section of the mine no additional exposures were available.



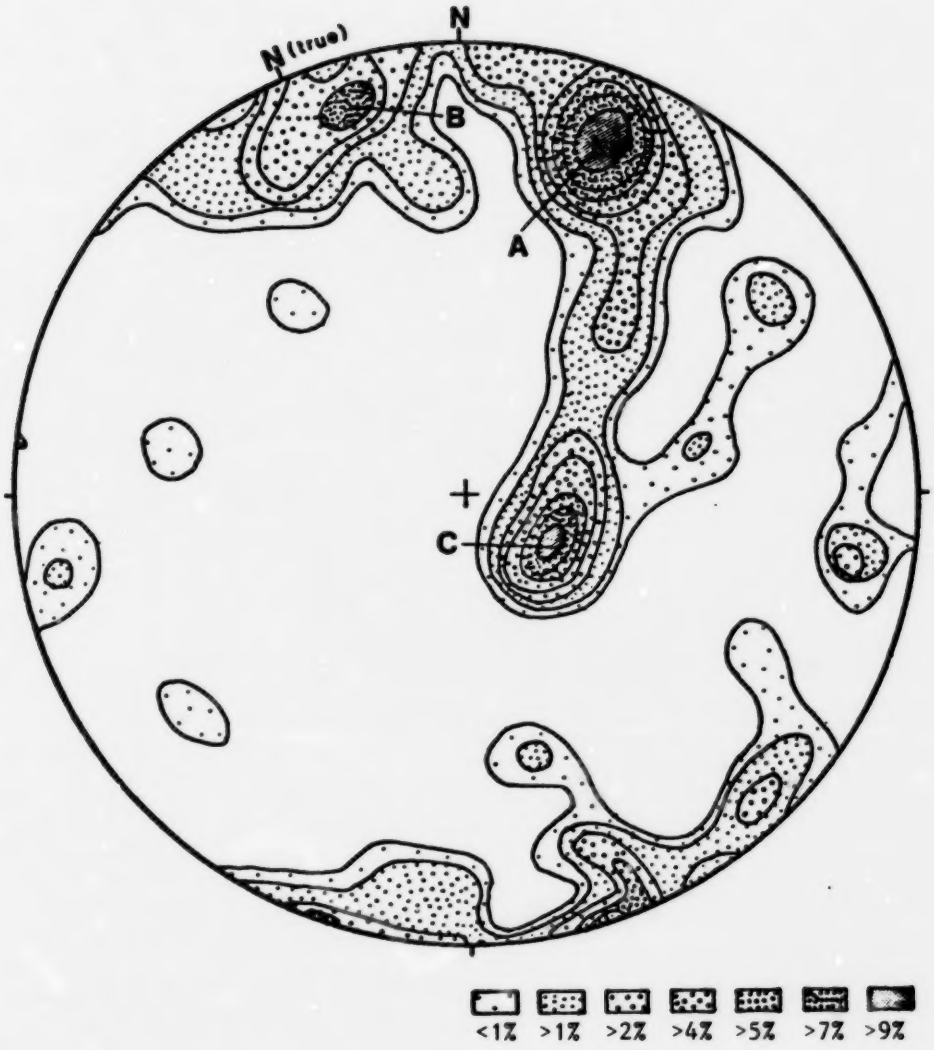
Mean Orientation of Discontinuities
(Dip direction/dip)

Set A : 201°/74°

Set B : 158°/80°

Set C : 291°/20°

Fig. 4 - Stereoplot diagram for footwall scanline 55-level; frequency contours in percent per 1% area for 132 observations.



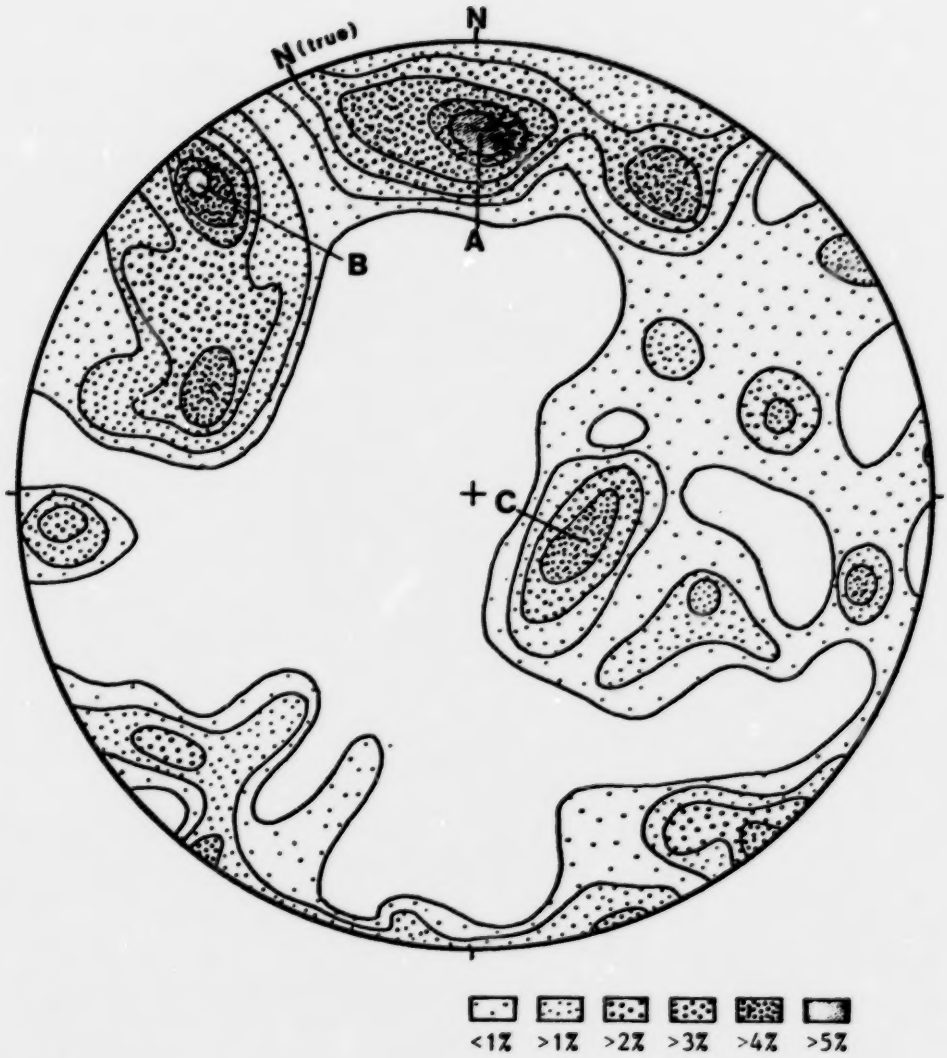
Mean Orientation of Discontinuities
(Dip direction/dip)

Set A : 202°/75°

Set B : 166°/80°

Set C : 301°/18°

Fig. 5 - Stereoplot diagram for footwall scanline 70-level South; frequency contours in percent per 1% area for 141 observations.



Mean orientation of discontinuities
(Dip direction/dip)

Set A : 180°/70°

Set B : 140°/78°

Set C : 303°/20°

Fig. 6 - Stereoplot diagram for orebody scanline 70-level South; frequency contours in percent per 1% area for 174 observations.

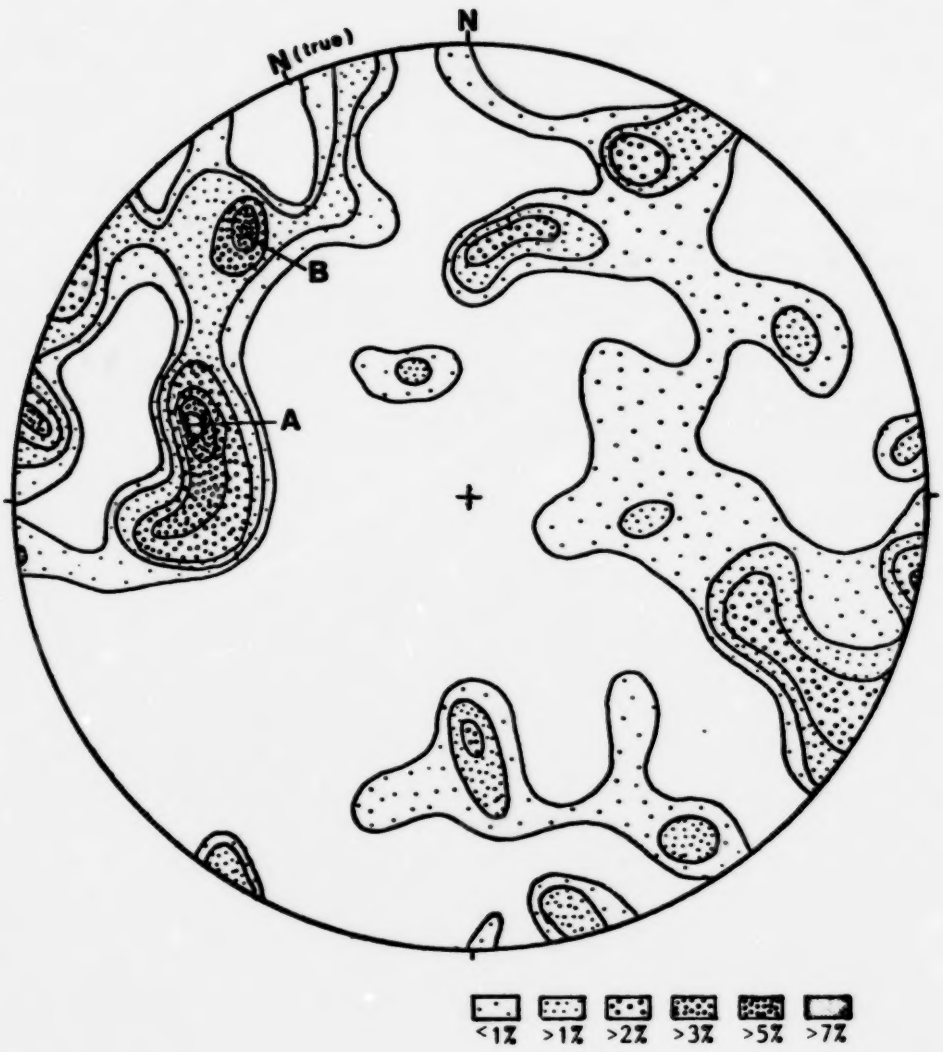
Mean orientation of discontinuities
(Dip direction/dip)

Set A : 171°/80°

Set B : 144°/76°

Set C : 154°/14°?

Fig. 7 - Stereoplot diagram for footwall scanline 60-level North; frequency contours in percent per 1% area for 134 observations.

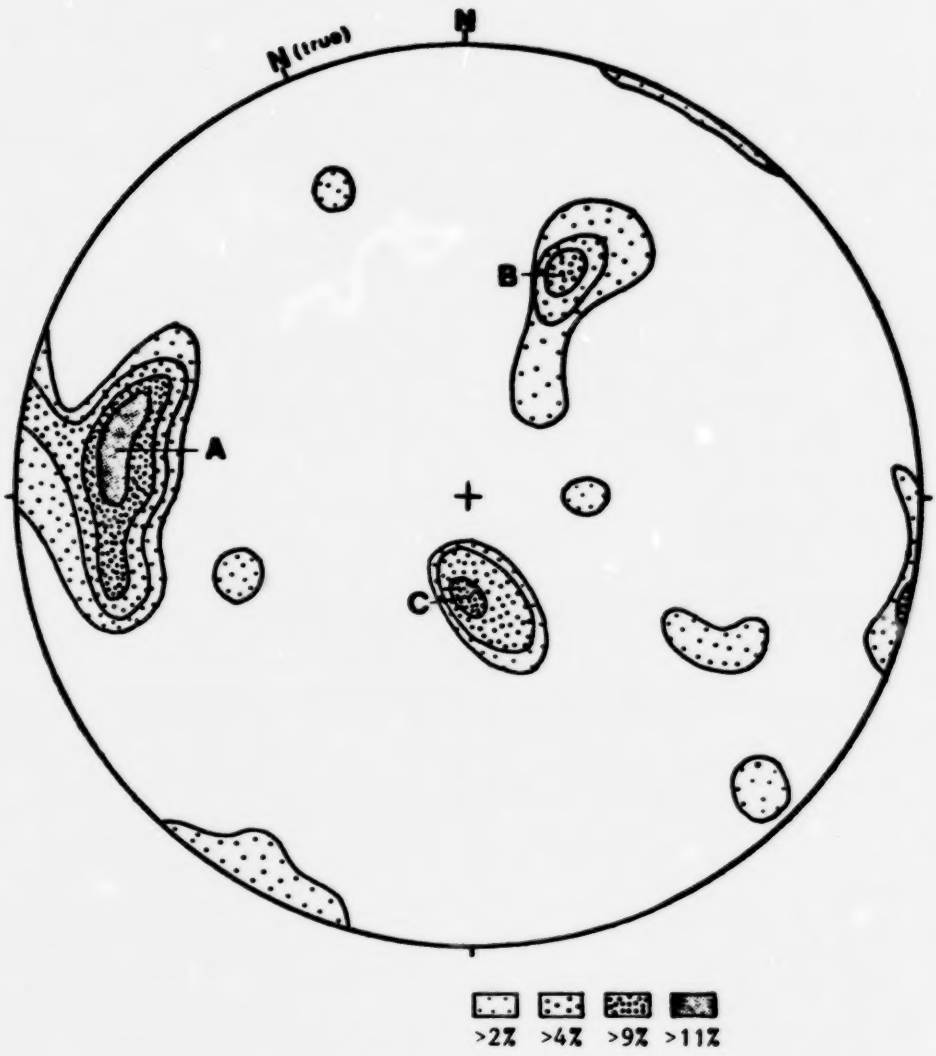


Mean orientation of discontinuities
(Dip direction/dip)

Set A : 107°/54°

Set B : 140°/66°

Fig. 8 - Stereoplot diagram for orebody scanline 60-level North; frequency contours in percent per 1% area for 105 observations.



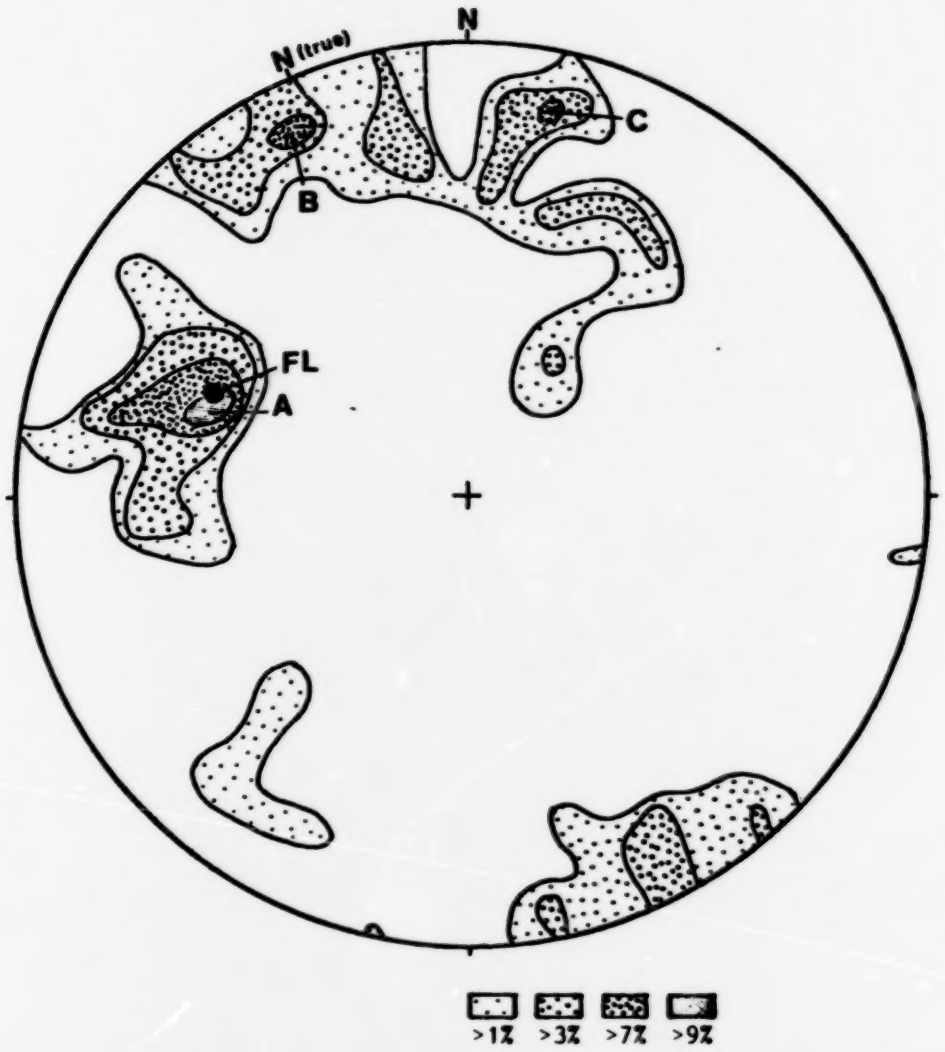
Mean orientation of discontinuities
(Dip direction/dip)

Set A : 096°/64°

Set B : 204°/46°?

Set C : 002°/18°

Fig. 9 - Stereoplot diagram for hanging wall scanline 60-level North: frequency contours in percent per 1% area for 42 observations.



Mean orientation of faults

Set A : 110°/50°

Set B : 156°/78°

Set C : 193°/75°

FL : Main Fault

Fig. 10 - Stereoplot diagram for faults on hanging wall, orebody and footwall in the investigation site, frequency contours in percent per 1% area for 51 observations.

fault sets, orthogonal to the main fault (or fault zone) and steeply dipping to the south can also be identified.

The results of analyses showed the following discontinuity concentrations given by dip direction and dip (in degrees) in relation to the mine North:

Geologic Location		Mean Orientation (Variation) Set A	Set B	Set C	Random
HANGING WALL		096/64 (065-125/48-90)	204/46 (190-215/40-60)	002/18 (320-025/10-35)	Few
	N*	107/54 (088-138/40-90)	140/66 (138-168/50-88)	-	Many
OREBODY	S*	180/70 (158-218/50-90)	140/78 (106-153/40-90)	303/20 (258-158/10-30)	Many
	N	170/80 (158-218/30-90)	144/76 (108-154/40-90)	154-14 (145-180/5-25)	Few
FOOTWALL	S	202/75 (185-225/32-90)	162-80 (136-178/55-90)	296/19 (250-325/5-32)	Few

Faults	Mean Orientation (Variation) Set A	Set B	Set C
(H/W, O/B, F/W)	110/50 (75-140/42-90)	156/78 (145-162/70-90)	193/75 (180-205/60-90)

The shallow dipping discontinuities (Set C), when well developed form nearly horizontal planes with relatively large extent along the roof of excavations and were significant structural features at the mine site. These appear to be more common than can be observed and recorded. An underestimation could be explained as a result of measurements only along a horizontal scanline and also lack of access to such discontinuities, particularly when occurring

* North section: approx. 3+50 N to 5+00 N (60 level), South section: approx. 3+50 N to 2+00 N (55, 70 levels) on strike the orebody were used throughout this report.

on roof exposures.

In Fig. 11 and 12, in a stereographic projection by means of great circles, the orientation and the relative angular relationship of prominent structural features and the mean orientation of orebody are illustrated.

SPACING

In a sub-surface underground excavation, as in the investigation site, discontinuity spacing values, particularly in combination with higher degrees of alteration, indicate the extent to which the intact rock and the discontinuity will affect the mechanical properties of the surrounding rock mass.

The discontinuity spacing values, evaluated on the rock exposure across the scanlines in the hanging wall, orebody and footwall, are summarized in Table 1.

As shown in Table 1, the relative spacing values of three dominant sets, A, B and C, can be defined as: moderately close and wide to very wide spaced successively. Knowing the spacing values for discontinuity sets, the density or number of discontinuities per volume was evaluated which provides an objective comparison of discontinuity densities in the hanging wall, orebody and footwall strata.

TRACE LENGTH

The discontinuity extent or size is a significant factor, and is essential to be evaluated since the strength on a failure surface is a function of the discontinuities trace length. In the investigation site, trace lengths were determined by quantitatively estimating the largest, visible lengths in any direction (both in direction of strike and/or in direction of dip) and classified in four size groups. Table 2 provides discontinuities trace lengths per size groups in the hanging wall, orebody and footwall.

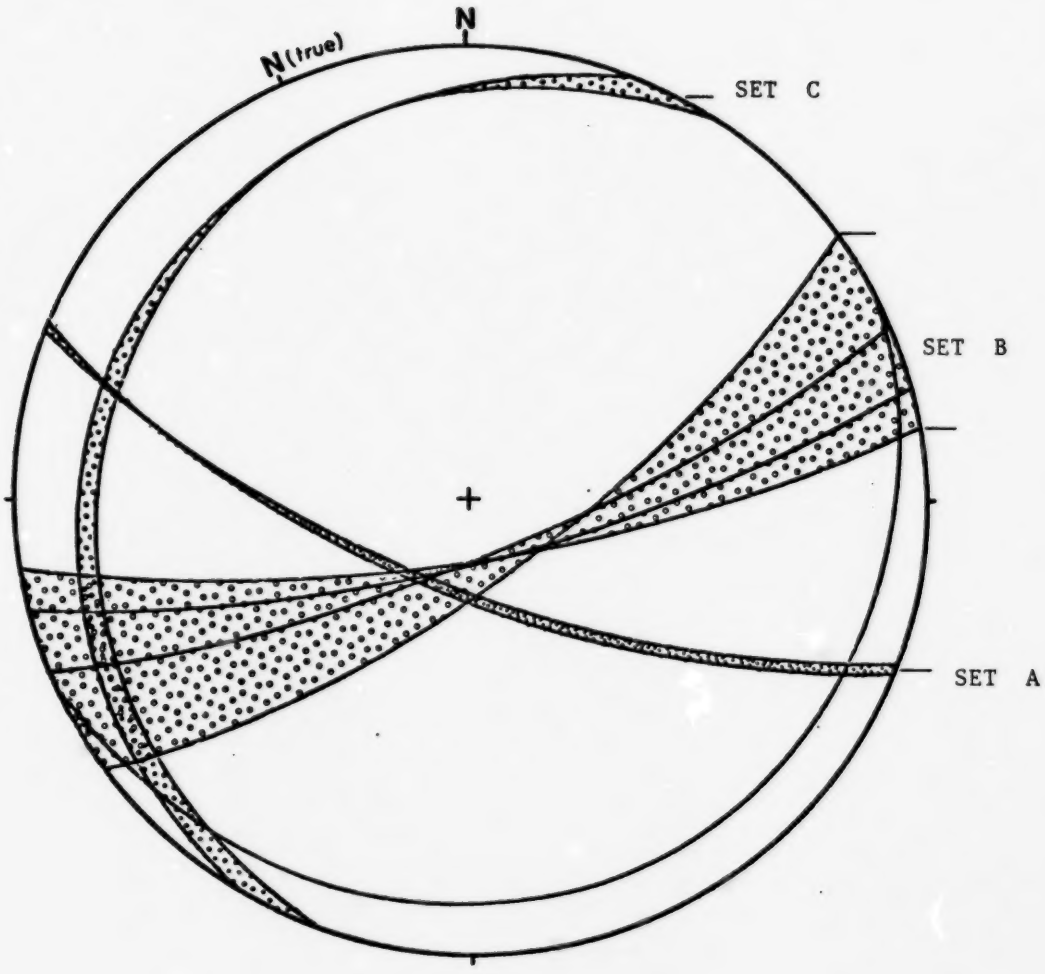


Fig. 11 - Orientation and the relative angular relationship of prominent structural features in the footwall strata.

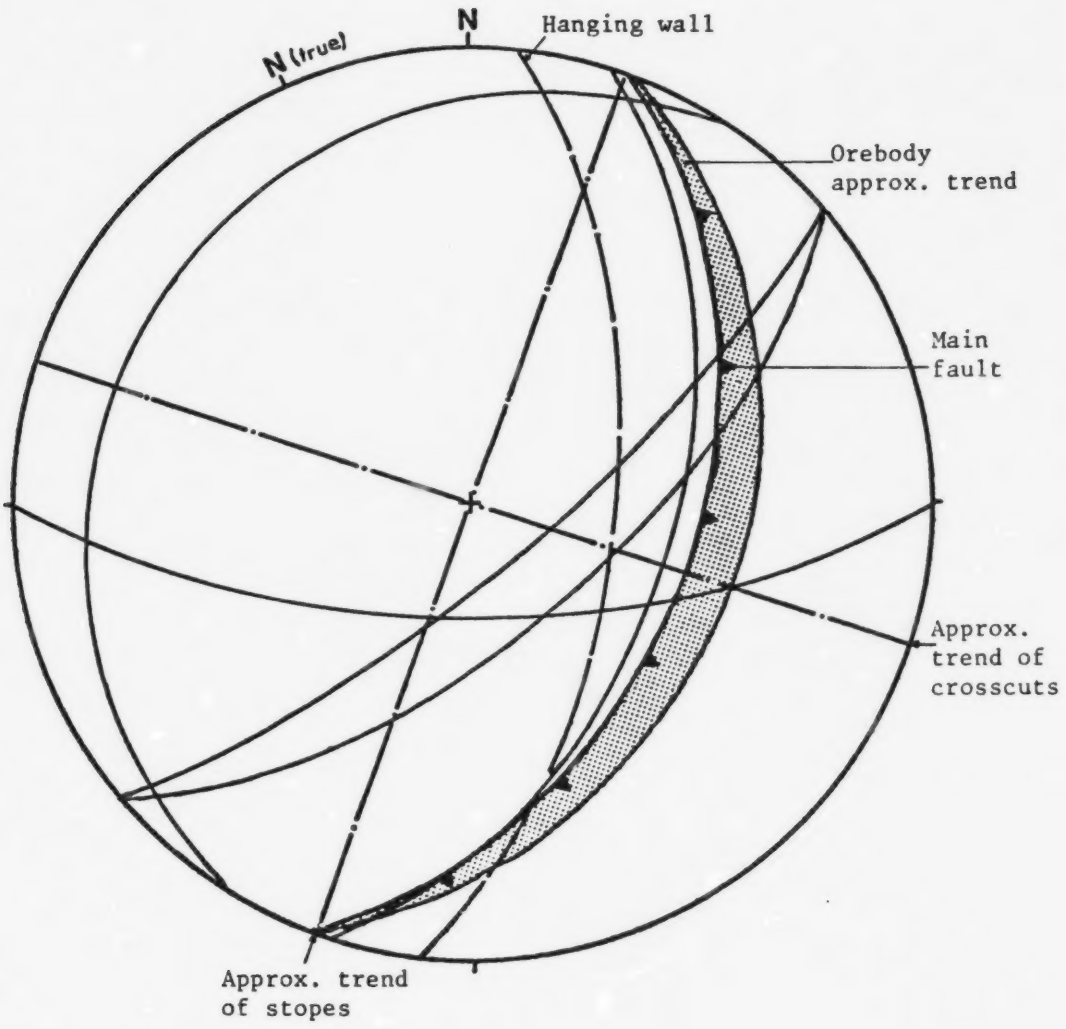


Fig. 12 - Orientation and relative angular relationship of prominent structural features in the orebody, hanging wall and the approximate trend of excavations.

Table 1 - Mean spacing values (m) per discontinuity set and discontinuity density

Geologic Location		Mean Spacing (m) Set A	Set B	Set C	Density N/V	Comments
HANGING WALL		1.50	6 ?	4.28	1.06/m^3	$\frac{N}{V} = \frac{L_1/S_1 + L_1/S_2 + L_1/S_3}{L_1^3}$
OREBODY	N	1.17	2.17	-	1.31/m^3	
	S	2.47	3.01	10.05	0.83/m^3	(where the total number, N, of discontinuities per volume, V, in a cube with length, L = 1 m and S = discontinuity set), random discontinuities not included.
FOOTWALL	N	1.44	2.38	10.06	1.21/m^3	
	S	2.08	2.51	4.18	1.13/m^3	

Table 2 - Number of observations per size group for discontinuity trace length

Geologic Location	No. of Observations	Trace length per size group (m) A 0.5-2.0	B 2.0-3.6	C >3.6	D	Comments
Hanging wall	42	8	22	12	-	Size group 'D' distinguished as discontinuities with no termination and comprises mainly faults and/or joints with large extent or undefined trace lengths.
Orebody	174	20	135	13	6	
Footwall	509	69	363	73	4	
H/W, O/B, F/W	725	97	520	98	10	
Percentage in size ranges (= Joint determination index)		13.4%	71.72%	13.51%	1.37%	

A structural plane is considered as continuous if its length is greater than one diameter or height of the excavation. It is also defined as continuous if it is less than excavation height, but is displaced by another discontinuity.

Interpretation of results revealed that preferred visible trace length of the discontinuities in the hanging wall, orebody and footwall were in size group B, ranging from 2.0 to 3.60 m and mainly truncated at excavation height. Around 70% of discontinuities which occurred in the excavations correspond to this size group.

In the investigation site, the discontinuity extent has been truncated at the excavation height or exposure limit. The height of the excavation wall, approximately 3.60 m, often provided a practical upper limit or termination to the trace lengths of discontinuities that could be observed in surveys. In cases of some major structures and fault planes, which tend to be extensive in two dimensions (on strike and dip), it is difficult to determine the actual trace length, therefore, only an estimate of their extent can be obtained. Since the entire surface of such structural planes are rarely exposed, this may lead, as at the mine site, to an underrepresentation of discontinuities trace length in size group D, and also partly in size group C.

In the investigation site, short fractures of less than 0.5 m extent were not sampled, therefore, the size group A may have been under-represented. Such fractures have been mainly observed to terminate against another joint or extend remarkably displaced by varying on strike or dip orientation, as in the orebody section.

Generally summarizing the results of the observations, the discontinuities can be divided into those which have both ends exposed, one end exposed and no end exposed (no termination):

	Both ends Exposed	One end Exposed	No end Exposed	Total
No. of observations	617	98	10	725
Average trace length (m)	2.02	∿3.6	>8	

This indicates that the trace length of discontinuities where both ends were exposed was generally smaller (2.02 m) than those where one or no termination can be observed. Discontinuity termination data were used only quantitatively to calculate the joint termination index.

ALTERATION

The strength along a discontinuity is affected by a number of factors, including the infilling material, surface asperities (roughness) and the degree of alteration of the discontinuity wall rock. These are sheared through during shear failure along the discontinuity and the shear strength of the structural discontinuity is therefore dependent on these parameters.

The observable characteristics of discontinuities were determined in the investigation site and a summary of the results is given in Table 3 and described in the following:

The possible contrast in strength between the discontinuity wall and the rock in the interior of the block (host rock) provides a useful indication of the character of discontinuity alteration. In the investigation site, around 70% of the discontinuities were slightly to moderately weathered, whereas the discontinuities in the ore zone revealed a higher degree of alteration. Unweathered discontinuity surfaces constitute a small portion of observations (≅ 11%) and higher values of relative alteration were mainly related to the faults and some continuous joints (≅ 21%).

In the mapped underground exposures, the discontinuity wall rock has the original strength, but some exceptions were the weakness zones where the rock has been discoloured, noticeably weakened in strength and most minerals

Table 3 - Discontinuity surface characteristics by geologic location expressed in percent per number of observations.

Geologic Location	No. of Observations	Stage of Alteration (%)					Type of Infilling (%)						Surface Asperities (%)		
		Unweathered	Slightly Weathered	Moderately Weathered	Highly Weathered	Completely Weathered	Free of Infilling	Limonite	Quartz/ Limonite	Kaolinite	Clay	Gouge	Smooth	Rough	Very Rough
HANGING WALL	42	14.24	30.95	47.67	7.14	-	40.47	26.29	7.14	19.06	7.14	-	21.42	50.01	28.57
OREBODY N	57	8.77	31.59	28.07	26.31	5.26	33.33	49.12	1.75	5.26	3.50	7.04	26.31	57.91	15.78
OREBODY S	117	-	21.36	45.29	21.36	11.99	23.93	44.44	6.83	14.52	0.85	9.43	11.96	60.68	27.36
FOOTWALL N	176	17.40	40.90	33.52	7.62	0.56	30.11	40.34	19.90	5.68	-	3.97	26.13	55.68	18.19
FOOTWALL S	333	9.00	51.65	24.32	12.61	2.42	12.01	49.24	29.72	4.20	2.10	2.73	23.42	58.85	17.73
H/W, O/B, F/W	725	9.79	41.37	31.38	13.65	3.61	21.65	44.96	20.16	7.17	1.79	4.27	22.34	57.79	19.87

decomposed into clay minerals. Commonly, discontinuity wall rock hardness (compressive strength) values corresponded approximately to 25-100 MPa.

INFILLING

As infilling has been considered to be any material that occurred between the planes of structural discontinuities, regardless of whether it is material weathered in place (in situ) or that has infiltrated or injected into the discontinuity. The type and thickness of infilling and the surface staining were determined.

The observations showed that the majority of discontinuity walls (60-80%) were limonites stained (rarely with carbonate) or consist of infilling material such as quartz, clay and kaolinite. A few weakness planes as major faults or joints with large extent, particularly in the South section of the mine, contained silty clay with a trace of some gouge, ranging in thickness from a few millimeters up to 250 mm. The percentage of discontinuities free of infilling material or surface staining constitute about 12-33% of the total number of observations in the footwall and orebody, whereas the percentage in the hanging wall exposure lay around 40%.

SURFACE ASPERITIES

Roughness is considered as those irregularities on a discontinuity surface that are in the order of a few millimeters in amplitude. Varying degrees of roughness on the discontinuity surfaces ranging from smooth, rough to very rough (partly extremely rough) have been distinguished to refine the characteristics of structural discontinuities. Discontinuities within different categories of roughness and due to planarity features occurred as planar, irregular or undulating structures in the exposures. In the investigation site, nearly 80% of structural discontinuities correspond to rough to very

rough and the remaining 17-21% revealed smooth surfaces.

GROUNDWATER OCCURRENCE

Groundwater occurrences on discontinuity surfaces in classes from dry to free or continuous inflow were estimated and described in Appendix A. A summary of the results is given in Table 4.

In the following qualitative observation of groundwater evidence on discontinuity surfaces is briefly described and given in percentage of total number of observations:

Class

1 5% : The discontinuity is tight; water flow along it does not appear possible.

2 13% : The discontinuity is dry with no evidence of water flow.

3 57% : The discontinuity is dry with evidence of past water flow, e.g., rust staining.

4 16% : The discontinuity is damp, but no free water is present.

5 8% : The discontinuity shows seepage, occasional drops of water, but no continuous flow.

6 ≤1% : The discontinuity shows a continuous flow of water with low, medium or high pressure.

The evidence of water or past water flow, as considerably high limonite staining on discontinuity surfaces, indicates that the discontinuities occurred dominantly with aperture, ranging in the order of up to a few millimeters. The fraction of discontinuities without separation or 'tight', where water flow along them does not appear possible, were not significant (≈5%).

As a result of major dewatering by the underground drainage system, implemented at the mine, the present data on groundwater occurrences (particularly classes 5 and 6) could be considerably underestimated. But, however,

Table 4 - Evidence of water on discontinuity surfaces in different classes, expressed in percentage

Geologic Location	No. of Observations	Water Occurrence in Classes (%) 1	2	3	4	5	6
Hanging wall	42	12	22	33	31	2	0
Orebody	174	3	6	52	22	17	0
Footwall	509	6	18	57	13	5	<1
H/W, O/B, F/W	725	5	13	57	16	8	<1

from occasional outwash of discontinuity infillings and currently large water flow in competent rock an initial inflow of groundwater, prior to mine dewatering, can be concluded.

CONCLUSIONS

From the rock mechanics viewpoint any geological structure that influences the rock mass properties of the in situ rock such as strength, modulus of deformation or permeability, is significant. The most common structural features of significance are weakness planes such as joints and 'shear' or faults. Because these are planar or near-planar discontinuities, they have strong anisotropic effects on the rock mass properties. A detailed mapping of all geological structures with respect to location, orientation, spacing and trace lengths (terminations) combined with observations of characteristics of discontinuity surfaces and physical properties of the rock mass will provide useful information on the structural pattern.

Mapping techniques have been developed at the Selbaie Mine and structural observations are regarded as sufficiently quantitative considering the overall condition of geological structures and the mine situation. Diamond drill cores may provide a continuous sample when core recovery is complete and at least two non-parallel holes are drilled in a limited section of the mine. But, underground openings have certain advantages over drill holes, notably in estimating more realistic, and refined discontinuity characteristics. In this regard, the mapping of excavations permit a valuable complement to a qualitative characterization of the rock mass by sampling and observing a sufficient number of discontinuities, so that the data can be analyzed statistically. However, the validity of the interpretation of the results is a function of several factors, e.g., orientation and dimensions of

excavations and also parameters which may influence the results of a structural survey.

At shallow depths, as in the investigation site, where stress magnitudes are not significant, rock mass structure which controls mining stability and influences overall rock mass strength, resulting in kinematic failures of potentially unstable wedges and blocks defined by these weakness planes, is especially important.

The results of structural analysis around the crown pillar can be summarized as follows:

1. Regarding the structural features, the investigation site can be divided on strike the orebody into the North and South sections, and perpendicular to the orebody into F/W, O/B and H/W strata. In both directions some 30° of changes in the orientation of dominant structures are defined, which are significant when comparing the O/B and F/W.
2. Most prominent structural features are the three discontinuity sets and the main fault or fault zone. Two discontinuity sets are NE-E oriented, steeply dipping to SE-SW, and the sub-horizontal set revealing nearly the same orientation, but dipping to W-NW. The latest, when well developed, formed the excavation roof.
3. The main fault on the F/W, O/B contact occurred in the South section as a highly altered 'shear' or fault zone containing sandy-clay gouge, which gradually narrows into the North section. Also minor fault sets, easterly oriented, steeply dipping to the S-SE and orthogonal to the main fault are defined as significant weakness planes in the mine site. The orientation of dominant structures in the O/B and H/W corresponds to the orientation of the main fault and appears to be associated with this fault.

4. The relative spacing values of discontinuity sets correspond to moderately close in the F/W, H/W and widely spaced in the O/B strata. In the O/B mainly small-scale fractures can be observed or the continuous structures were displaced and reoriented during the late tectonic activities (or formation of the orebody).
5. The variability in the pattern of structural discontinuities indicates that the effect of alteration increases from north to south and is highest in the extreme south on the O/B.
6. The majority of discontinuities are characterized as rough to very rough (partly extremely rough) irregular, undulating with surface staining or infilling.

ACKNOWLEDGEMENT

The author wishes to express his gratitude to the management and personnel at Selbaie Mine for their cooperation and assistance.

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APPENDIX A - Mapping Sheets

- KEY -

DISCONTINUITY DATA

Type: JN - Joint

FL - Fault

Orientation: Dip direction and dip in degrees.

Trace length (size):

A - 0.5-2.0 m

B - 2.0-3.6 m

C - >3.6 m

D - Undefined or no termination

Infilling (thickness in mm):

L - Limonite

Q - Quartz

C - Clay

S - Silt

K - Kaolinite

G - Gouge

Water occurrences:

Class 1 - The discontinuity is tight; water flow along it does not appear possible.

Class 2 - The discontinuity is dry with no evidence of water flow.

Class 3 - The discontinuity is dry with evidence of past water flow, e.g., rust staining of discontinuity surface.

Class 4 - The discontinuity is damp but no free water is present.

Class 5 - The discontinuity shows seepage, occasional drops of water, but no continuous flow.

Class 6 - The discontinuity shows a continuous flow of water, i.e., low, medium, high pressure.

Weathering on discontinuity surface:

FJ - Fresh jointed (unweathered)

SW - Slightly weathered

MW - Moderately weathered

HW - Highly weathered

CW - Completely weathered.

Surface asperities:

S - Smooth

R - Rough

VR - Very rough

I - Irregular

U - Undulating

P - Planar

LITHOLOGY (ROCK TYPE):

DAT - Dacite/dacitic rocks

(different variations of dacitic rocks as: dacitic tuff, tuff lapilli, dacitic quartz eye and welded acitic tuff were not distinguished in mapping procedure).

COMPRESSIVE STRENGTH (Hardness):

Estimated by simple mechanical test with hammer.

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dmn.	Formatn.	Level	Location
0,1,0,1	, , , , , ,	5,2,2,2	,	, , ,	, , ,	, , , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+,0,4,	3,+,3,7,0,5,	0,0,4	0,0,3	,1,2,0,5		2,1	, , ,

Remarks: S55-Drift, 05-3-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type										Identification	S55,0,5,-,3,-,9,8		
	Discontinuity				Size	Flng. Type	Aperture	Flng. Thickn. (mm)	Surface Condition		Lthlgy.	Hrdn.
No.	Distance	Type	Slip direction	Dip					Wealth.	Rough.		
,1	, , ,0	JN	2,1,5	,8,0	B	1 .	2	. .	F,J	S,U,	D,A,T	R,G
,2	, ,0,.4	Y	1,1,9	,7,8	B	L, .	2	. .	S,W	S,F,	~,	~,
,3	, , ,1	Y	3,5,0	,8,8	C	L .	3	. .	S,W	R,U,	~,	~,
,4	, , ,2	Y	2,1,0	,3,0	C	L,R.	3	5,0,	N,W	R,U,F	~,	~,
,5	, ,2,.5	Y	0,1,0	,7,5	A	1 .	3	. .	S,W	R,U,	~,	~,
,6	, , ,3	Y	2,1,1	,3,2	B	L,R.	3	4,0,	N,W	R,F,	~,	Y
,7	, ,3,.4	Y	1,6,2	,8,5	B	L,R.	3	4,0,	S,W	R,F,	~,	Y
,8	, , ,4	Y	3,1,5	,2,5	C	L .	3	. .	S,W	R,U,F	~,	~,
,9	, ,4,.8	Y	2,3,2	,6,0	B	1 .	1	. .	F,J	S,P,	~,	~,
1,0	, , ,5	Y	3,5,1	,6,8	C	L .	3	. .	N,W	R,U,	~,	~,
1,1	, ,5,.1	Y	3,2,5	,2,5	B	L .	3	. .	S,W	S,P,	~,	~,
1,2	, ,5,.4	Y	3,2,2	,2,6	B	L .	3	. .	S,W	S,	~,	Y
1,3	, , ,6	Y	1,9,8	,7,5	C	L .	2	. .	S,W	S,P,	~,	~,
1,4	, , ,7	Y	1,9,2	,8,0	B	1 .	3	. .	S,W	S,P,	~,	~,
1,5	, ,7,.2	Y	2,3,0	,2,8	C	L,R,	3	3,0,	N,W	S,	~,	Y
1,6	, , ,8	Y	1,8,0	,7,8	B	1 .	2	. .	F,J	R,F,	~,	~,
1,7	, ,8,.3	Y	0,4,5	,8,7	B	1 .	1	. .	F,J	S,	~,	~,
1,8	, , ,9	Y	3,2,5	,2,5	B	1 .	1	. .	F,J	S,	~,	~,
1,9	, ,9,.6	Y	2,4,6	,4,6	A	1 .	2	. .	F,J	R,	~,	~,
2,0	, ,1,0	Y	2,1,8	,3,2	C	L,R,	4	4,0,	N,W	R,P,	~,	~,
2,1	, ,1,0,.1	Y	1,7,6	,7,6	B	L .	2	. .	S,W	R,	~,	~,
2,2	, ,1,0,.3	Y	2,9,6	,7,8	B	1 .	1	. .	F,J	R,P,	~,	~,
2,3	, , ,1,1	Y	1,7,5	,4,8	.	L .	3	. .	S,W	R,P,	~,	~,
2,4	, ,1,0,.3	Y	2,2,2	,7,4	A	1 .	2	. .	F,J	R,	~,	Y
2,5	, , ,1,2	Y	3,0,3	,1,7	B	L .	3	. .	S,W	S,P,	~,	~,
2,6	, , ,1,4	Y	1,8,5	,8,5	B	L .	3	. .	S,W	R,U,	~,	Y
2,7	, ,1,0,.5	Y	2,3,2	,8,6	A	L .	3	. .	S,W	R,	~,	~,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dem.	Formatn.	Level	Location
0,1,0,1		5,2,2.5,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+,0,4,	3,+,3,7.,5,	0,0,4	0,0.7	,3,5		2,7	

Remarks: S55 - Drift 05-3-98 ; Footwall

DISCONTINUITY DATA

*,0,2 Card Type												Identification	S55-05-3-98
	Discontinuity				Infill	Fling	Fling Ratio	Fling Thick. (mm)	Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type			Weath.	Rough.		
2,8	,1,8	J,N	2,2,7	,8,2	A		2		F,J	S,U,	D,A,T	R,4
2,9	,1,8,3		2,6,7	,1,4	B	R.	2	3.0.	S,W	R,1,4		
3,0	,2,0		2,9,7	,1,8	C	4 R.	3	2.0,	S,W	R,1,4		
3,1	,2,4		1,9,0	,7,2	A		2		F,J	R,F,		
3,2	,2,6		2,7,8	,2,0	B	L.	3		S,W	R,1,4		
3,3	,2,7		2,8,0	,1,5	B	L.	3		S,W	R,4,		
3,4	,2,8		0,0,0	,8,0	B	L.	2		S,W	R,U,		
3,5	,2,9		2,5,0	,7,5	B	.	3		S,W	S,P,		
3,6	,3,0		1,8,0	,7,2	B	L.	3		S,W	R,U,		
3,7	,30.5		2,1,6	,5,8	C	L.	3		S,W	S,4,		
3,8	,3,1		3,4,2	,2,2	B	L S.	2		M,W	R,U,		
3,9	,3,2		0,3,4	,8,0	B	L .	2		S,W	R,U,,		
4,0	,3,3		3,5,2	,5,5	C	L.	3		M,W	V,R,4		
4,1	,3,5		0,0,0	,7,8	C	L S.	5		H,W	V,R,4		R,3
4,2	,4,0		0,2,2	,8,2	B	L.	5		H,W	R,P,		R,3
4,3	,4,0,4		3,5,0	,2,8	C	L.	5		H,W	R,P,		4,3
4,4	,4,2		3,1,0	,8,0	B	L.	3		M,W	S,P,		2,4
4,5	,4,4		2,9,6	,7,5	B	L.	2		S,W	V,R,		
4,6	,4,5		3,1,5	,1,7	C	L R.	3		M,W	S,P,		
4,7	,4,6		3,4,6	,7,4	A	L.	2		S,W	R,		
4,8	,4,6,5		1,7,5	,7,7	A	L.	2		S,W	S,P,		
4,9	,4,7		0,4,0	,8,8	A	L.	2		S,W	V,R,4		
5,0	,4,8		1,4,5	,9,0	A	L.	3		S,W	V,R,4		
5,1	,4,9		1,6,0	,2,3	B	L R.	3	1,7,	M,W	R,P,		
5,2	,5,0		2,2,5	,5,0	B	R.	3	1,5,	S,W	R,U,		
5,3	,5,1		0,1,0	,7,1	B	L.	3		M,W	R,U,		
5,4	,5,2		0,0,6	,7,4	A	.	1		F,J	R,P,		

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dam.	Formatn.	Level	Location
0,1,0,1		5229.				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
18+15	3+85	003	22	1,5		27	

Remarks: S55 + Drift 05-3-98 ; Footwall

DISCONTINUITY DATA

*,0,2 Card Type											Identification	S55-05-3-98	
	Discontinuity					Flng.		Flng.	Surface condition				
No.	Distance	Type	Dip Direction	Dip		Type		Width (mm)	Weath.	Rough.	Lthlgy.	Hrdn.
55	15,3	JN	164	70	A	L.	3		SW	R	DAF	R4
56	15,32	"	238	64	B	R.	3	4.0	SW	RP		
57	15,4	T	237	62	B	L.	3		SW	RP		
58	15,42	T	232	63	B	L.	3		SW	SF		
59	15,5	T	201	44	C	L.	4	6.0	MW	UR		
60	15,62	"	225	80	C	L.	3		MW	RU		
61	15,7	T	354	15	C	R.	2	20	SW	URU		
62	16,02	"	242	90	B	L.	3		SW	RF		
63	16,1	T	165	80	B	L.	3		SW	RU		
64	16,15	FL	210	62	C	C.	4	2.0	MW	URU		R3
65	16,18	JN	225	70	C	SL	4		MW	RU		R4
66	16,2	T	325	18	C	R.	2	9.0	SW	RUU		
67	16,25	F	230	75	C	L.	4		MW	RUU		
68	16,3	T	235	73	B	L.	2		SW	SU		
69	16,4	F	010	56	A	L.	3		MW	RU		
70	16,4	T	160	90	A	L.	2		SW	SF		
71	16,45	F	200	87	C	L.	2		SW	SP		
72	16,5	T	210	82	C	QR.	4	10	HW	URU		
73	16,55	T	040	72	A	R.	2	2.0	MW	RF		
74	16,6	T	180	90	C	L.	2		MW	RU		
75	16,6	FL	218	82	C	L.	5		MW	RU		R3
76	66,3	JN	317	16	B	R.	3	3.0	SW	RU		R4
77	16,7	FL	246	54	C	SC.	5	1.0	HW	RU		R3
78	16,76	JN	300	17	C	L.	3		MW	RU		RH
79	16,75	"	180	90	B	R.	2		SW	RU		
80	16,79	"	026	38	B	L.	3		SW	RF		
81	16,8	T	286	88	B	L.	3		MW	RU		

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dsn.	Formatn.	Level	Location
0,1,0,1	, , , , , ,	5,2,2,9,	,	, ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+,1,6,	2,+,7,2, ,	0,0,2	,0,0	1,8,.,5		2,7	, , ,

Remarks: S55 - Drift 05-3-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type												Identification S,5,5,0,5,3,9,8	
No.	Discontinuity Distance	Type	Dip Direction	Dip	Sty (Q)	Flng. Type	Flng. Width	Flng. Width (mm)	Surface condition Weath.	Surface condition Rough.	Lthlgy.	Hrdn.
8,2	,6,8,.,5	J N	2,1,5	,8,0	C	L R.	6	1.0,	H,W	V,R,	D,A,T	R,4
8,3	, ,6,9	J	3,4,7	,2,5	B	L R.	4	5.0,	H,W	R,	, ,	R
8,4	,6,9,.,2	R	2,2,5	,7,8	A	L.	3	, ,	S,W	S,R,	, ,	,
8,5	,6,9,.,4	,	2,2,7	,7,5	C	L.	3	, ,	M,W	V,R,F	, ,	,
8,6	, ,7,0	,	2,3,5	,7,6	C	L.	3	, ,	H,W	S,P,	R,	R
8,7	, ,7,1	,	2,3,2	,6,5	C	L.	3	, ,	S,W	V,R,F	R,	R
8,8	, ,7,2	,	2,4,0	,6,7	C	L.	3	, ,	S,W	A,F,	R,	R
8,9	,7,3,.,3	,	2,4,2	,6,8	C	L.	4	, ,	S,W	R,F,	R,	R
9,0	,7,4,.,5	,	2,4,0	,3,8	A	L.	4	, ,	S,W	R,F,	, ,	,
9,1	, ,7,7	,	1,9,2	,2,8	B	L R.	4	, ,	M,W	R,F,	R,	R
9,2	,7,7,.,3	,	2,5,0	,2,3	B	L.	5	, ,	H,W	R,F,	R,	R
9,3	, ,7,8	,	2,1,6	,2,8	A	L.	4	, ,	S,W	R,	R,	R
9,4	,7,8,.,3	,	2,1,8	,9,0	B	L S.	4	6,0,	M,W	R,F,	R,	R
9,5	,7,8,.,8	,	2,5,5	,6,7	B	L.	4	, ,	M,W	R,F,	, ,	,
9,6	, ,7,9	,	2,4,6	,7,0	C	L.	3	, ,	S,W	R,	R,	R
9,7	,7,9,.,5	,	3,3,0	,1,5	C	R.	3	1,0,	S,W	S,R,	R,	R
9,9	,7,9,.,1	,	2,4,0	,7,6	C	L.	3	, ,	S,W	V,R,F	, ,	,
10,0	,8,0,.,2	,	2,4,2	,8,0	B	,	2	, ,	S,W	R,W,F	, ,	R
10,1	,8,0,.,5	,	3,2,8	,1,5	B	L.	3	, ,	S,W	R,F,	R,	R
10,2	, ,8,1	,	2,2,0	,5,5	B	L.	3	, ,	S,W	R,F,	R,	R
10,3	, ,8,2	,	2,9,5	,6,6	B	,	2	, ,	S,W	R,	, ,	R
10,4	,8,2,.,5	,	2,6,5	,4,5	B	Q.	3	3,0,	S,W	R,F,	, ,	,
10,5	, ,8,4	F,L	9,1,5	,8,2	C	L.	5	, ,	H,W	V,R,	R,	R,3
10,6	, ,8,5	J N	9,1,5	,8,2	B	L.	3	, ,	M,W	R,F,	R,	R,4
10,7	,8,5,.,4	R	3,1,0	,4,7	A	L.	3	, ,	S,W	V,R,	R,	R
10,8	, ,8,6	R	2,4,3	,8,5	B	L.	3	, ,	S,W	R,F,	, ,	,
10,9	, ,8,7	R	1,8,2	,3,5	B	L R.	4	, ,	M,W	V,R,F	, ,	,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dtm.	Formatn.	Level	Location
0,1,0,1		5,2,2,8.9				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,8,+,2,1	2,+5,1,	0,1,0	0,2,6	,0,1,2		2,4	

Remarks: S55 - Drift 05-3-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type											Identification S55,0,5-3-9,8			
	Discontinuity				Set No.	Flng.		Waviness	Flng. thick. (mm)	Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type				Wealth.	Rough.		
11,0	,8,7.3	J N	2,1,5	,6,5	B	L.		3	. .	M,W	R,I,U	D A,T	R,4
11,1	,8,8	Y	2,3,5	,6,0	C	L.		3	. .	M,W	R,L,	~,	~,
11,2	,88.3	Y	2,4,6	,7,6	C	L.		2	, ,	S,W	R,L,	~,	~,
11,3	, ,8,9	~	2,2,0	,7,0	C	L.		3	, ,	S,W	R,L,	~,	~,
11,4	, ,9,1	Y	2,1,0	,8,0	C	L.		4	. .	M,W	V,R,U	~,	R,3
11,5	, ,9,3	~	2,8,0	,6,7	B	L.		3	. .	M,W	V,R,S	~,	~,
11,6	,93.,1	~	0,4,2	,7,0	B	L,		3	, ,	M,W	R,	~,	~,
11,7	,93.,2	Y	0,2,0	,1,7	C	C	R.	3	50-60	H,W	R,U,E	~,	~,
11,8	, ,9,4	I	2,2,0	,7,0	C		L.	3	. .	S,W	V,R,E	~,	~,
11,9	, ,9,5	Y	2,2,2	,7,2	A			3	, ,	S,W	R,	~,	~,
11,9	,9,5,.5	~	2,8,5	,4,7	B	L	R,	3	, ,	S,W	V,R,E	~,	~,
12,0	, ,9,6	~	0,2,5	,6,2	B		L,	3	, ,	S,W	R,	~,	~,
12,1	, ,9,7	~	2,1,5	,8,2	B		L,	4	, ,	M,W	R,	~,	~,
12,2	,9,7.,3	~	2,7,0	,1,2	B	S	C,	5	30,	H,W	R,E,U	~,	~,
12,3	, ,9,9	~	2,7,0	,2,5	A		L,	2	, ,	S,W	R,	~,	~,
12,4	,9,9.,5	~	0,4,0	,8,8	B		L,	3	, ,	M,W	V,R,	~,	~,
12,5	,1,0,0	~	0,4,5	,7,0	B	R	L.	3	, ,	M,W	R,R	~,	~,
12,6	,1,0,1	~	9,5,0	,7,2	A			2	, ,	S,W	R,	~,	~,
12,7	,1,0,3	F,L	2,3,6	,2,5	D	S	C,	6	2-5g	G,W	V,R,	~,	R,2
12,8	,1,0,4	J N	3,4,0	,2,0	C		R,	3	, ,	M,W	S,U,	~,	R,4
12,9	,1,0,5	F,L	1,7,5	,8,0	D	C	S.	5	, ,	H,W	V,R,	~,	R,3
13,0	,1,0,5	F,L	1,7,6	,8,2	D		L,	4	, ,	H,W	V,R,	~,	R,3
13,1	,1,0,5,.1	J N	1,6,0	,6,6	C	S	C,	4	40,	H,W	V,R,	~,	R,4
13,2	,1,0,5,.2	J N	1,5,7	,6,0	B		L,	3	, ,	M,W	V,R,	~,	~,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dam.	Formatn.	Level	Location
0,1,0,1		52,2,4,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7,+56	4,+7,2,	0,2,0	0,0,1	,1,9		2,7	

Remarks: N60-Drift. 06-4-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type										Identification N60 06-4-98			
	Discontinuity				Qu	Fling			Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type		Flag. Thick. (mm)	Weath.	Rough.		
,1	,,9,0	J,N	1,5,4	,6,3	C	L.	3	. .	S,W	R, ,	D,A,T	R,4
,2	,,0,5	T	3,0,5	,7,0	A	L.	3	. .	S,W	R,P,		T
,3	,,0,7	T	0,2,2	,6,2	B	.	2	. .	S,W	R,P,		T
,4	,,1,1	C	2,0,5	,7,8	B	L.	3	. .	S,W	R, ,		T
,5	,,,2	T	1,6,5	,7,7	B	VL.	3	20	S,W	R, ,		R,3
,6	,2,,8	C	1,6,0	,7,2	B	L.	3	. .	S,W	R,P,		R,4
,7	,,,3	T	2,7,5	,8,0	C	UR.	3	1,0	S,W	U,R,P		T
,8	,,4,5	T	2,2,5	,7,6	B	L.	3	. .	S,W	R,P,		T
,9	,,5,5	T	1,9,5	,3,2	A	L.	3	. .	S,W	R,P,		T
1,0	,,,6	T	0,0,5	,6,6	B	.	2	. .	S,W	R,W,		T
1,1	,,,7	C	1,2,0	,5,0	A	L,	2	. .	S,W	R,P,		C
1,2	,,,8	W	1,6,5	,7,8	B	.	2	. .	M,W	R,P,		T
1,3	,,8,5	T	1,6,5	,7,7	B	.	2	. .	M,W	R, ,		T
1,4	,,,9	C	1,7,3	,8,0	B	.	2	. .	S,W	R, ,		T
1,5	,,9,4	C	1,3,5	,5,2	A	LQ,	3	1,8	S,W	R, ,		T
1,6	,,1,0	C	1,3,4	,5,0	A	.	2	. .	S,W	R, ,		T
1,7	,,10,5	C	1,7,0	,7,0	B	LR.	3	. .	S,W	R,L,		T
1,8	,,1,2	C	3,4,0	,5,4	B	L,	3	. .	S,W	R,W,		T
1,9	,,1,3	T	0,1,0	,6,0	B	L,	3	. .	S,W	R,W,		T
2,0	,,1,4	T	1,3,5	,4,2	A	.	2	. .	F,I	R, ,		T
2,1	,,14,3	T	1,8,5	,6,0	B	LR.	3	2,0	M,W	R, ,		T
2,2	,,1,5	C	9,8,0	,9,0	B	L.	3	. .	S,W	R,P,		T
2,3	,,1,6	T	9,6,5	,6,0	B	L,	3	. .	S,W	R, ,		T
2,4	,,1,7	T	2,3,0	,6,2	B	.	2	. .	F,I	R, ,		T
2,5	,,1,7	T	1,8,0	,9,0	B	K,	3	. .	H,W	R, ,		R,3
2,6	,,1,8	C	1,3,5	,8,0	A	.	1	. .	F,I	R,W,2		R,4
2,7	,,1,9	T	2,0,8	,7,5	B	.	2	. .	F,I	R,C,		R,4

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dim.	Formatn.	Level	Location
0,1,0,1		5,2,2.3,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+,1,1	4,+,5,3.5,	0,2,0	,0,5	. .1,4		2,7	

Remarks: NCO – Drift, 06-4-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type										Identification	NCO,0,6,4,9,8		
	Discontinuity				Set No.	Fill		Flag.	Surface condition				
No.	Distance	Type	Dip Direction	Dip		Type	Width (mm)	(Thick. mm)	Wall	Rough.	Lthlgy.	Hrdn.
28	,,1,9	JN	1,5,5	,7,0	A	L.	3	. .	S,W	V,R,	D,A,T	R,4
29	,,2,0	"	2,7,6	,7,2	B	L.	3	. .	S,W	R,F,	,,"	"
30	,2,0,5	"	3,1,0	,8,0	B	L.	3	. .	S,W	S,F,	,,"	"
31	,,2,1	"	2,8,8	,5,6	B	L.	3	. .	M,W	S,P,	,,"	"
32	,2,1,5	"	1,2,8	,8,0	B	L.	4	. .	M,W	R,G,	,,"	"
33	,,2,2	"	1,8,2	,7,0	B	L.	3	. .	M,W	R, ,	,,"	"
34	,2,2,5	"	0,2,0	,6,5	B	L.	3	. .	S,W	S,W,	,,"	"
35	,2,2,7	"	1,9,0	,6,2	A	.	1	. .	F,J	S,F,	,,"	"
36	,,2,3	"	0,4,5	,5,6	B	L,W.	4	. .	M,W	V,R,W,	,,"	R,3
37	,,2,3	"	2,3,2	,5,0	A	R.	2	. .	S,W	R,L,	,,"	R,4
38	,,2,4	"	2,0,0	,6,2	B	L.	3	. .	S,W	R,F,	,,"	"
39	,,2,5	"	2,9,2	,6,4	B	L,2.	4	. .	M,W	R,W,	,,"	"
40	,2,5,4	"	2,8,8	,4,0	B	.	1	. .	F,J	S,W,I	,,"	"
41	,,2,6	"	1,5,8	,6,0	B	L.	3	. .	M,W	R, ,	,,"	"
42	,,2,7	"	2,1,5	,6,1	B	L.	2	. .	M,W	L, ,	,,"	"
43	,2,7,5	"	1,7,8	,5,2	A	L.	3	. .	M,W	R,I,	,,"	"
44	,,2,8	"	0,3,0	,4,2	B	L,R.	5	. .	M,W	R,W,C	,,"	"
45	,2,8,4	"	2,1,0	,6,0	B	R.	3	. .	S,W	R,F,	,,"	"
46	,,2,9	"	2,2,0	,6,1	B	R.	3	. .	S,W	R,I,	,,"	"
47	,2,9,2	"	1,6,5	,7,6	B	L.	3	. .	M,W	V,R,F	,,"	"
48	,,3,0	"	1,2,5	,8,0	B	L.	3	. .	S,W	R,F,	,,"	"
49	,,3,1	"	1,6,5	,7,4	B	L.	4	. .	M,W	V,R,	,,"	"
50	,3,1,2	"	1,9,0	,8,0	B	L.	3,1	. .	M,W	S,P,	,,"	"
51	,3,1,3	"	2,0,6	,5,7	B	.	2	. .	S,W	R,P,	,,"	"
52	,,3,2	F,C	1,9,2	,7,5	B	R.	4	2,0,	S,W	R, ,	,,"	R,3
53	,,3,2	"	3,5,0	,2,8	B	L.	5	. .	S,W	R,W,	,,"	R,4
54	,,3,3	"	2,1,0	,7,0	B	R.	3	. .	S,W	R, ,	,,"	"

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dsn.	Formatn.	Level	Location
0,1,0,1		5,2,2,3,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7,+,6,8,	4,+,4,0,	0,2,2	,00	,1,3		2,7	

Remarks: N60 - Drift . 06 - 4 - 98 ; FOOTWALL

DISCONTINUITY DATA

,0,2 Card Type											Identification N60,0,6-4-98			
	Discontinuity				Infill	Flng.	Intens.	Flng. Thick. (mm)	Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type			Wealth.	Rough.		
5,5	,33,2	JN	1,8,5	,1,5	B	R.	3	1.0,	M,W	R,C,	D,A,T	E,4
5,6	,3,4	"	1,1,0	,1,0	B	"	2	2.0.	S,W	R,	"	"
5,7	,34.5	"	4,8,2	,8,5	B	"	3	,	M,W	S,C,	"	"
5,8	,3,5	F,C	1,8,5	,7,8	B	R.	3	1.5,	M,W	,	"	R,3
5,9	,3,5	J,W	2,4,2	,6,7	B	"	2	,	F,J	S,	"	W,4
6,0	,3,5,2	J	0,3,8	,3,4	B	"	2	,	F,J	S,	"	W
6,1	,35,3	"	1,5,0	,1,0	B	"	2	,	F,J	B,	"	J
6,2	,36	J	3,2,0	,0,5	B	R.	3	2.0,	S,W	R,	"	J
6,3	,36.3	"	1,7,0	,7,6	B	"	2	,	F,J	S,	"	"
6,4	,3,7	J	1,6,5	,7,5	B	"	2	,	F,J	S,	"	J
6,5	,3,7,5	J	2,2,0	,6,5	B	"	2	,	S,W	S,P,	"	J
6,6	,3,8	J	2,1,0	,7,0	B	"	2	,	F,J	S,	"	"
6,7	,3,9	J	2,2,5	,6,2	B	Q.	3	1,4,	M,W	R,	"	"
6,8	,39.2	J	1,5,2	,1,5	B	Q.	3	1,7,	M,W	R,	"	"
6,9	,4,0	J	1,4,3	,5,6	A	C.	3	,	S,W	S,C,	"	"
7,0	,40	J	1,9,0	,5,6	B	C.	3	,	S,W	R,C,	"	"
7,1	,4,1	F,C	1,9,3	,7,5	C	C.	5	1,3,	M,W	V,R,	"	R,3
7,2	,4,2	J,W	1,8,8	,7,3	B	"	2	,	S,W	S,P,	"	R,4
7,3	,4,2	J	1,9,5	,7,8	B	Q.	3	,	S,W	R,	"	J
7,4	,43	J	1,9,0	,9,0	B	R.	3	1,2,	S,W	R,C,	"	J
7,5	,44	J	0,8,2	,9,5	A	"	2	,	F,J	S,	"	J
7,6	,44.5	J	1,2,5	,8,4	A	"	2	,	F,J	V,R,	"	"
7,7	,4,5	J	1,8,8	,8,3	B	C.	3	,	S,W	R,C,	"	"
7,8	,4,5	F,C	2,2,8	,3,6	C	Q.	4	,	M,W	V,R,C	"	R,3
7,9	,46	J,W	2,1,0	,1,5	C	R.	4	,	S,W	R,	"	R,4
8,0	,46.3	J	1,9,6	,9,0	B	C.	3	,	M,W	R,	"	J
8,1	,46.8	J	1,9,7	,8,8	B	C.	3	,	M,W	R,	"	"

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dam.	Formatn.	Level	Location
0,1,0,1		5,2,2,2,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,7,+,7,7,	4,+,3,0,	0,2,6	+,0,4	.,1,6		27	

Remarks: N60 - Draft ; 06-4-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type											Identification N60,2,6-4-9,8		
	Discontinuity				Gen.	Fing.	Fing.	Fing.	Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type	Thick. (mm)		Weath.	Rough.		
2,2	,,4,7	J,N	0,2,7	,6,4	B	4	Q,	3	8,	M,W	R,C,	D,I,T	R,4
2,3	,,4,8	F	2,3,3	,6,5	B		Q,	3	1,2,	M,W	R,C,		
2,4	,,4,9	F	0,2,9	,7,6	B	4	R,	3	1,0,	M,W	C,R,		
2,5	,4,9,+	F	2,3,0	,3,6	B	L	Q,	3	1,2,	S,W	S,P,		
2,6	,,5,0	F	0,2,2	,9,2	O			2		S,W	R,		
2,7	,,5,1	F	9,0,5	,9,0	B	4	R,	3	2,0,	M,W	R,C,		
2,8	,5,1,2	F,L	3,1,4	,8,6	C	L	R,	3	2,4,	H,W	V,R,		R,3
2,9	,,5,2	J,N	3,5,2	,7,0	B		L,	3		M,W	V,R,		
3,0	,,5,2	F	2,5,3	,6,7	B		Q,	3	7,	M,W	R,C,		R,4
3,1	,,5,3	F	9,0,8	,7,8	B		L,	3		H,W	V,R,C		
3,2	,,5,4	F	2,4,3	,7,5	B	L	R,	3	9,	M,W	R,C,		
3,3	,,5,4	J	2,8,0	,1,7	C		L,	3		M,W	R,U,		
3,4	,5,4,5	F	3,0,8	,7,8	B	L	R,	3	1,3,	M,W	R,		
3,5	,,5,5	F,L	9,0,5	,9,0	C	L	W,	4		H,W	V,R,		R,3
3,6	,,5,6	J,W	1,7,5	,7,2	B		L,	3		S,W	R,C,		R,4
3,7	,,5,7	F	0,4,6	,7,0	B		L,	3		M,W	R,C,		
3,8	,,5,8	F	1,7,0	,6,8	B		L,	3		M,W	S,C,		
3,9	,5,8,3	F	9,3,0	,6,7	B		L,	3		S,W	R,C,		
4,0	,5,8,6	F	4,5,0	,6,8	B	L	Q,	3	1,1,	M,W	R,C,		
4,1	,,5,9	F	1,5,3	,7,0	R		L,	3		M,W	R,		
4,2	,5,9,6	F	3,1,5	,5,3	A			2		F,W	S,P,		
4,3	,,6,0	F	1,6,5	,7,2	B		L,	3		M,W	R,		
4,4	,6,0,3	F	0,7,3	,8,0	C		L,	3		H,W	R,C,		
4,5	,6,0,6	F	9,0,3	,5,6	B		W,	3		H,W	R,		R,3
4,6	,,6,1	F	1,6,5	,8,0	B			2		H,W	V,R,C		R,4
4,7	,,6,2	F	1,6,6	,8,2	B			4		M,W	V,R,C		
4,8	,,6,3	F,L	3,5,6	,8,5	B		L,	5		M,W	R,		R,3

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dam.	Formatn.	Level	Location
0,1,0,1	, , , , , ,	5,2,2.2	,	, ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,7,+,8.0,	4,+,1,2.5,	1,7.5	±,0,1	. ,3,5		2,6	, , ,

Remarks: N60 - Drift ; 06-4-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type Identification N60,4:0,6-9,8

No.	Discontinuity: Distance	Type	Dip Direction	Dip	Sn	Flnj: Type	Flnj: Rgh.	Flnj: Flange mm/cm	Surface condition: Weath.	Surface condition: Rough.	Lithlgy.	Hrdn.
10,9	,6,5	JN	0,2,0	,9,0	B		2		Mw	R,C,	D,A,T	R4
11,0	,6,7	F	0,3,0	,5,0	M		1		F,J	R,		
11,1	,6,8	F	1,6,0	,7,0	B		2		Sw	R,		
11,2	,6,9	F	1,5,0	,6,5	R	L	3		Mw	V,R,		
11,3	,7,1	F	0,4,0	,7,0	M		1		F,J	R,		
11,4	,7,2	F	2,0,1	,5,8	B		1		F,J	R,		
11,5	,7,4	F	2,3,0	,5,0	B		1		F,J	R,		
11,6	,7,5	F	0,5,0	,6,8	A		1		F,J	R,		
11,7	,7,7	F	1,9,2	,1,1	B		2		F,J	S,		
11,8	,7,9	F	1,6,0	,8,5	B	L	4		Mw	S,P,		
11,9	,7,9,5	F	1,9,2	,8,5	B	L	4		Mw	S,		
12,0	,8,0	F	1,5,3	,6,2	B	L	3		Mw	V,R,		
12,1	,8,1	F,C	1,6,5	,7,0	C	L	4		Mw			R3
12,2	,8,2	J,N	2,5,0	,5,0	A		2		Mw	S,P,		R4
12,3	,8,2,7	F	3,3,0	,5,1	B	L	3		Mw	S,P,		R
12,4	,8,7	F,C	3,5,3	,7,0	C	L	3		Mw	R,		R3
12,5	,9,1	J,N	2,1,5	,5,0	B	L	3		Sw	R,		R4
12,6	,9,2	F	3,3,0	,5,4	B		1		F,J	S,		R
12,7	,9,3	F	1,9,2	,7,6	B	L	3		Mw	R,C,		R
12,8	,9,3,8	F	1,4,5	,5,5	B		2		Sw	S,		
12,9	,9,5	F	1,4,7	,7,0	B		2		Mw	R,		
13,0	,9,6	F	2,2,0	,5,5	B		2		Sw	R,		
13,1	,9,6,7	F	0,0,8	,8,0	B	L	3		Sw	R,		
13,2	,9,8	F	3,1,0	,1,5	C	L R	3	1,8,	Sw	S,W,		R
13,3	,9,9	F	2,0,5	,8,0	B	L	2		Mw	S,		
13,4	,10,0	F	2,0,6	,1,5	B	L	3		Sw	R,		
,	, , ,	,	, , ,	, ,	,	,	,	, ,	,	, , ,	, , ,	,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dmn.	Formatn.	Level	Location
0,1,0,1	, , , , , , ,	52,3,2,4	,	, ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
17,8,1	3,+,7,0, ,	0,9,0	+,0,0	. .1,1		2,7	, , ,

Remarks: N60 - Drift(X-cut), 06-4-94 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type										Identification	N60,0,6-4-9,4	
No.	Discontinuity: Distance	Type	Dip Direction	Dip	Set No.	Flag: Type	Flag: Set No.	Flag: Thick. (mm)	Surface condition: Weath.	Surface condition: Rough.	Lthlgy.	Hrdn.
,1	,,0,5	S,N	4,1,0	,5,0	A	,	2	, ,	F,J	S, ,	D,A,T	R,4
,2	,,0,8	V	3,1,5	,5,5	B	,	3	, ,	S,W	V,R,C	~,	~,
,3	,,1,0,1	T	1,8,5	,5,6	B	,	3	, ,	S,W	R,Cl,	~,	~,
,4	,,1,0,3	T	4,8,0	,6,5	B	,	3	, ,	S,W	R, ,	~,	~,
,5	,,1,0,6	T	2,7,5	,6,8	B	,	3	, ,	F,J	S, ,	~,	~,
,6	,,2,0,2	T	2,1,5	,5,8	B	L,	3	, ,	S,W	R,C,	~,	~,
,7	,,2,0,7	T	3,3,0	,8,0	B	L,	3	, ,	S,W	S,P,	~,	~,
,8	,,,3	T	3,6,0	,6,2	B	L,	3	, ,	M,W	R, ,	~,	~,
,9	,,3,0,1	T	3,5,0	,7,5	A	L,	2	, ,	M,W	R, ,	~,	~,
1,0	,,3,0,4	T	1,0,5	,5,4	B	,	2	, ,	S,W	S, ,	~,	~,
1,1	,,,4	T	3,1,0	,7,8	B	L,	2	, ,	M,W	R,C,	~,	~
1,2	,,4,0,3	T	1,0,0	,4,6	B	,	3	, ,	S,W	S, ,	~,	~
1,3	,,4,0,5	T	1,8,5	,2,2	A	L,	3	, ,	S,W	S, ,	~,	~
1,4	,,,5	T	2,0,8	,7,2	B	,	3	, ,	S,W	S, ,	~,	~,
1,5	,,,6	T	3,2,5	,8,7	C	K,	3	, ,	M,W	R,K,	~,	R,3
1,6	,,6,0,4	T	1,1,2	,6,8	B	L,	3	, ,	S,W	S, ,	~,	R,4
1,7	,,,7	T	1,4,2	,8,0	B	L,	4	1,5,	M,W	S,I,	~,	R,3
1,8	,,7,0,3	T	2,8,2	,5,0	B	L,	4	1,8,	M,W	R,I,	~,	~,
1,9	,,,8	T	1,8,5	,6,8	B	L,	4	, ,	M,W	R, ,	~,	R,4
2,0	,,,8	T	1,3,5	,9,0	B	,	1	, ,	F,J	, ,	~,	~,
2,1	,,8,0,6	T	1,8,7	,5,0	B	L,	3	, ,	S,W	S, ,	~,	~,
2,2	,,,9	T	3,2,0	,7,0	B	L,	2	, ,	S,W	R, ,	~,	~,
2,3	,,,9	T	1,8,5	,5,1	B	L,	3	, ,	M,W	R,Cl,	~,	~,
2,4	,,9,0,3	T	1,6,2	,7,6	B	L,	3	, ,	M,W	R,Cl,	~,	R,3
2,5	,,1,0	T	3,2,0	,6,6	B	,	1	, ,	F,J	R, ,	~,	R,4
2,6	,,10,5	T	0,2,6	,3,7	A	L,	3	, ,	S,W	S, ,	~,	~
2,7	,,10,8	T	3,2,3	,8,0	B	L,	3	, ,	M,W	R,P,	~,	~,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dsn.	Formatn.	Level	Location
0,1,0,1		5222.				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
17+58.2	3+70,	090	I,0.0	.23		26	

Remarks: N60_Drift 06-4-94 ; FOOTWALL/OREBODY

DISCONTINUITY DATA

*,0,2 Card Type									Identification N60 ,0,6-4-94			
	Discontinuity				Size	Fling. Type	Fling. Number	Fling. thick. (mm)	Surface condition Weath.	Surface condition Rough.	Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip								
28	,,14	FL	100	,48	D	G.	5	200	C,W	F,	D,B,F	R,2
29	,14.3	J,N	020	,60	B	K.	2	. .	H,W	R,	,,	R,3
30	,,15	"	290	,36	B	.	3	, ,	S,W	R,	OREBODY	
31	,,16	"	130	,51	B	G.	4	3,0	M,W	R,	D,A,F	↓
32	,,17	"	120	,90	B	.	4	. .	M,W	V,R,	,,	R,3
33	,,18	"	310	,25	B	.	4	. .	M,W	R,	,,	"
34	,,18	"	304	,25	B	.	3	. .	M,W	R,	"	"
35	,18.7	"	012	,60	A	L.	3	. .	S,W	R,	, ,	"
36	,,24	J,W	230	,70	B	L.	3	. .	M,W	R,F,	D,A,F	R,4
37	,,25	"	810	,82	B	L,	3	. .	M,W	S,	,,	"
38	,25.6	"	350	,82	B	L,	2	. .	S,W	R,	,,	"
39	,,27	"	310	,35	B	L,	3	. .	S,W	R,P,	,,	"
40	,27.2	"	285	,85	B	,	3	. .	S,W	V,R,	,,	"
41	,,28	"	228	,75	B	L,	3	. .	M,W	V,R,	,,	"
42	,,28	"	180	,60	B	,	2	. .	M,W	R,	,,	"
43	,,29	"	024	,84	R	G.	4	2,0	H,W	V,R,F	,,	R,3
44	,,29	"	124	,82	B	.	3	. .	S,W	R,	"	R,4
45	,29.5	"	305	,85	B	L,	3	. .	S,W	S,	"	"
46	,30.1	"	290	,48	B	.	2	. .	S,W	R,U,	,,	"
47	,,31	"	240	,72	A	L.	3	. .	S,W	R,	"	"
48	,32.2	"	160	,75	B	L,	2	. .	F,J	S,	"	"
49	,,34	"	210	,46	C	L,	5	. .	H,W	V,R,	"	"
50	,34.3	"	302	,90	B	,	3	. .	M,W	S,P,	"	"
51	,34.5	"	230	,15	B	L,	2	. .	S,W	R,	"	"
52	,36.5	"	150	,88	B	,	1	. .	F,J	S,	,,	"
53	,37.5	"	102	,25	A	L.	4	. .	M,W	R,	"	"

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dsn.	Formatn.	Level	Location
0,1,0,1		5,222				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7,+,27	3,+7,1,	0,9,0	±,0,0	.23		27	

Remarks: N60 – Drift, 06-4-94 OREBODY / HANGINGWALL

DISCONTINUITY DATA

*,0,2 Card Type										Identification N60, 06-4-94			
	Discontinuity				Fill	Fltg. Type	Fltg. Width	Fltg. Thick. (mm)	Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip					Weath.	Rough.		
54	,3,8	JN	1,9,0	,25	B		2		SW	R	DAT	R4
55	,3,9	"	1,5,2	,86	B	IL.	2		SW	R	"	"
56	,4,0	"	3,4,6	,48	B	L.	3		SW	R	"	"
57	,40.4	"	1,2,5	,90	B	L.	2		SW	SR	"	"
58	,4,4	FL	0,1,1	,60	B	L.	5		HW	SR	"	R3
59	,4,5	JW	3,1,3	,88	B				FJ	R	"	"
60	,4,6	"	0,5,5	,70	CL	L.	4		MW	VR	HANGINGWALL	
61	,4,7	"	2,3,0	,40	B	L.	3		MW	VR	"	R4
62	,4,7	"	2,3,2	,41	B	L.	3		MW	VR	"	"
63	,48.5	"	1,2,5	,90	B		2		SW	R	"	"
64	,4,9	"	9,4,0	,82	B	L	3		SW	VR	"	R3
65	,50.5	"	1,1,3	,86	B		1		FJ	SP	"	R4
66	,5,0	"	2,8,8	9,20	B	L	4		MW	VR	"	"
67	50.5	"	1,2,5	,68	B		1		SW	SP	"	"
68	50.6	"	0,6,2	,90	B	L	4		HW	VR	"	"
69	52.5	"	1,1,4	,65	B	L	2		SW	SP	"	"
70	53.1	"	1,0,0	,65	C	LC	4		HW	SP	"	R3
71	53.5	"	2,9,0	,85	B		2		SW	SP	"	R4
72	,5,5	"	0,9,8	,67	C	L	3		SW	S	"	"
73	,5,6	"	0,0,4	,27	C	LL.	3		MW	RUG	"	R3
74	,5,7	"	0,0,8	,30	C	.	3		MW	R	"	R4
75	,5,7	"	0,0,5	,27	B		3		MW	R	"	"
76	57.5	"	1,2,5	,90	B	L	3		SW	R	"	"
77	,60	"	1,1,5	,60	B		1		FJ	S	"	"
78		"	1,1,7	,57	B		1		FJ	S	"	"
79	60.1	"	3,2,2	,55	B		1		FJ	RF	"	"
80	,6,1	"	2,4,0	,25	B	.	2		FJ	R	"	"

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dam.	Formatn.	Level	Location
0,1,0,1		522.2				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7,+,19	3,+,7,1,	0,90	±,00	,1,3		2,1	

Remarks: N60-Drift . 06-4-94 ; HANGINGWALL

DISCONTINUITY DATA

*,0,2 Card Type											Identification N60,0,6-4-94			
	Discontinuity					Fling					Surface condition			
No.	Distance	Type	Dip Direction	Dip	Roughness	Type		Width	Fling Thick. (mm)		Weath.	Rough.	Lthlgy.	Hrdn.
8,1	,1,6,2	J,N	1,3,0	,6,5	B	L	R.	3	1.5.		M,W	R,	D,A,V	R,4
8,2	,1,6,2,2	Y	1,3,2	6,4	B		.	3	. .		M,W	R,	C,	-,
8,3	,1,6,2,5	C	3,3,0	,48	B		L.	7	. .		M,W	R,U,	,	-
8,4	,1,6,3	C	1,3,0	,58	B		.	2	. .		S,W	R,C,	C,	-
8,5	,1,6,3,5	~1	0,9,4	,42	B		.	2	. .		F,W	S,P,	C,	-,
8,6	,1,6,3,6	Y	0,4,8	,9,0	B		L.	4	. .		M,W	R,	C,	-,
8,7	,1,6,4,3	F,L	1,2,5	,7,0	B		K.	4	. .		S,W	R,	C,	2,3
8,8	,1,6,5	F,L	1,4,0	,6,4	C	L	C.	4	1.2,		H,W	V,R,	C,	2,3
8,9	,1,6,6,7	J,W	0,9,8	,7,5	B		.	2	. .		S,W	V,R,	C,	2,4,
9,0	,1,6,1,2	Y	2,2,5	,5,1	B	K	L,	4	. .		H,W	V,R,I	C,	R,3
9,1	,1,6,8,,2	Y	1,8,0	,6,5	B		,	2	. .		S,W	V,R,I	C,	R,4
9,2	,1,6,9	Y	1,1,5	,7,6	B		K,	5	. .		M,W	R,C,	C,	R,3
9,3	,1,7,0	C	2,3,8	,5,5	B	L	C,	2	1,0,		M,W	R,V,I	C,	-,
9,4	, , ,	Y	3,4,0	,2,0	B		L,	3	. .		S,W	R,Ba	C,	-,
9,5	,1,7,1	Y	3,4,3	,8,1	B		L,	3	. .		S,W	S,I	C,	-,
9,6	,1,7,3	Y	1,2,5	,7,2	C		,	3	. .		S,W	R,	C,	-,
9,7	,1,7,5	C	1,2,0	,6,5	C		.	4	. .		M,W	R,P,	C,	-,
9,8	Road ,	,	0,2,5	,1,5	C	K	L,	4	. .		M,W	R,B,	C,	R,3
9,9	Joints	,	0,2,7	,1,7	C		,	4	. .		M,W	R,P,	C,	R,4
10,0	, , ,	,	0,2,5	,1,5	B		.	4	. .		M,W	V,R,P	C,	-,
10,1	,1,7,5	,	0,2,8	,1,8	C		.	4	. .		M,W	V,R,P	C,	4
...	, , ,	,	, ,	, ,	, ,		.		, ,		,	, ,	, ,	,
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,	, , ,	,	, ,	, ,	, ,		,		, ,		,	, ,	, ,	,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dom.	Formatn.	Level	Location
0,1,0,1	, , , , , , ,	52 2.4,	,	, ,	, , ,	, , ,

Local Grid		Traverse				Kos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,7,+,6,0,	4,+,5,6, ,	0,9,0	±,0,0	, ,1,6		2,7	, , ,

Remarks: N60 - Crosscut : 06-4-13 FOOTWALL / OREBODY

DISCONTINUITY DATA

*,0,2 Card Type										Identification	N60, 0,6,-4-1,3		
	Discontinuity					Fling-			Surface condition				
No.	Distance	Type	Dip Direction	Dip	Set No.	Type	Irregularity	Fling Thickness (mm)	Waviness	Roughness	Lithlgy.	Hrdn.
,1	, ,0,0	JN	3,0,5	,6,2	B	L.	3	. .	SW	S,P,	D,A,T	R,4
,2	, 2,8	Y	0,5,5	,9,0	A	.	2	. .	SW	V,R,P	, ,	,
,3	, ,3	T	3,0,2	,5,5	B	G.	3	1,2,	MW	S,P,	, ,	R,3
,4	, ,4	F	1,1,5	,4,0	B	G	4	1,2,	MW	R,U,	, ,	R,3
,5	, ,5	F	1,4,0	,9,0	B	.	2	. .	F,J	R,U,	, ,	R,4
,6	, 5,2	Y	2,4,5	,5,6	B	R.	3	8, ,	S,U	V,R,C	, ,	,
,7	, ,6	Y	1,3,0	,5,5	B	C,R.	3	9, ,	SW	V,R,C	, ,	,
,8	, ,7	T	2,2,3	,8,0	B	L.	4	. .	S,W	V,R,	, ,	,
,9	, 7,8	F	1,4,5	,5,8	B	L.	3	. .	SW	R,C,	, ,	,
1,0	, ,8	T	2,2,0	,5,0	B	C,R.	5	1,5,	MW	V,R,U	, ,	,
1,1	, 8,1	T	0,0,0	,6,0	B	L,	2	, ,	M,W	V,R,	, ,	,
1,2	, 8,3	F	1,6,2	,6,5	B	L,	3	, ,	SW	R,C,	, ,	,
1,3	, 8,3	F	1,6,4	,6,5	B	L,	3	, ,	SW	R,C,	, ,	,
1,4	, 8,4	F	3,2,5	,6,0	B	L,	3	, ,	SW	R,C,	, ,	,
1,5	, 8,5	F	2,3,5	,5,0	B	C,R,	5	1,7,	M,W	V,R,C	, ,	,
1,6	, , 9	F	1,2,8	,5,0	B	L,	3	, ,	SW	R,C,	, ,	,
1,7	, 9,2	F	2,4,5	,3,5	A	C,R.	3	5, ,	MW	R,C,U	, ,	,
1,8	, ,1,0	F	1,2,4	,5,0	B	L,	3	, ,	SW	R,C,	ORE	BODY
1,9	, ,1,1	F	2,6,0	,6,3	B	,	3	, ,	M,W	R,	, ,	,
2,0	, ,1,2	F	1,5,5	,6,5	B	L,	4	, ,	MW	V,R,	, ,	,
2,1	, 12,5	F,L	2,2,0	,8,0	C	L,R.	4	9, ,	HW	V,R,	, ,	R,3
2,2	, ,1,3	JN	1,5,2	,7,8	B	L,	3	, ,	F,J	S,	D,T,C	R,4
2,3	, 13,4	F	3,1,6	,5,1	B	,	3	, ,	SW	R,C,	, ,	,
2,4	, ,1,4	F	1,6,5	,6,3	B	,	3	, ,	SW	S,	, ,	,
2,5	, 14,5	F	1,6,2	,6,0	B	L,	2	, ,	M,W	R,	, ,	R,3
2,6	, ,1,5	F,L	1,1,2	,6,5	B	K,	4	5, ,	HW	S,P,	, ,	R,3
2,7	, ,1,6	JN	1,3,5	,6,0	C	L	4	6, ,	H,W	R,P,	, ,	R,4

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dam.	Formatn.	Level	Location
0,1,0,1	, , , , , , ,	5224,	,	, ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7, +4,5,	4, +57,5,	0,9,2	± 0.0	. ,0,9		1,7	, , ,

Remarks: N60-CROSSCUT 06-4-13 . OREBODY

DISCONTINUITY DATA

*,0,2 Card Type									Identification N60, 216 ;4-1,3			
	Discontinuity				Set No.	Fltg.	Fltg. Thick.	Fltg. Thick. (mm)	Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type			Weath.	Rough.		
2,8	, ,1,7	F,L	1,3,2	,58	C	C.	4	8. ,	H,W	R,P,	D,T,L	R,3
2,9	, ,1,8	J,N	1,8,5	,8,0	A	.	1	. ,	F,J	R,U,	~,	R,4
3,0	, ,1,9	~	2,1,6,2	,4,6	A	L.	3	, ,	M,W	R,U,	~,	~,
3,1	, 1,9,4	~	2,1,6,7	,7,6	B	L.	3	, ,	S,W	S,P,	~,	~,
3,2	, ,2,0	~	1,1,6,5	,3,7	B	L.	4	, ,	H,W	R,F,	, ~	~,
3,3	,2,0,4	F,L	1,1,1,3	,5,0	C	L.	5	9.5,	H,W	R,P,	, ~,	~,
3,4	,2,1,,5	J,N	1,1,6,3	,6,5	C	L,	4	, ,	H,W	V,R,F	, ~,	~,
3,5	, ,2,2	~	2,1,6,5	,2,5	B	L.	3	, ,	H,W	S, ,	, ~	~,
3,6	, ,2,3	~	1,1,4,5	,5,5	B	.	3	, ,	M,W	S, ,	, ~	~,
3,7	, ,2,3	~	0,1,2,3	,4,5	B	L,	4	, ,	S,W	S,U,	~,	~,
3,8	,2,3,,3	~	0,1,2,5	,4,5	B	L,	4	, ,	S,W	S,U,	~,	~,
3,9	, ,2,4	F,L	4,9,2	,8,3	B	K,	5	, ,	H,W	R,F,	~,	~,?
4,0	, ,2,5	F,L	1,2,0	,8,0	B	,	5	, ,	H,W	R,P,	~,	~,?
4,1	,2,5,4	F,L	1,1,6,5	,2,5	B	,	5	, ,	H,W	R,U,	, ~	~,?
4,2	, ,2,6	F,L	2,3,0	,6,0	B	L,	5	, ,	M,W	R, ,	~,	~,?
4,3	,2,6,,3	J,N	0,1,4,5	,6,2	B	K,	5	, ,	H,W	R,F,	~,	~,?
4,4	,2,6,,5	~	1,0,0	,6,5	B	L.	5	, ,	S,W	R,F,	~,	~
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,
,	, , ,	,	, ,	, ,		,		, ,	,	, ,	, ,	,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dam.	Formatn.	Level	Location
0,1,0,1	, , , , , , ,	5,2,1,2,	,	, ,	, , ,	, , ,

Local Grid		Traverse				Kos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,7,+,9,5,	3,+,4,5, ,	0,1,5	+,0.0	, ,1,2		2,7	, , ,

Remarks: 870-Drift . 07-3-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type Identification 870,2,7-3-9,8

No.	Discontinuity Distance	Type	Dip Direction	Dip	Size	Flng. Type	Size	Flng. Thkn. (mm)	Surface condition Weath.	Surface condition Rough.	Lthlgy.	Hrdn.
,1	, , ,1	JN	1,8,2	,8,5	C	L.	5	, ,	M,W	S,P,	D,A,T	R,4
,2	, 2,1,6	JN	2,5,0	,4,6	C	U,R..	2	5.0,	M,W	R,F,	, ,	,
,3	, 2,.5	X	2,6,5	,7,0	B	L.	4	, ,	M,W	R,	, ,	,
,4	, , ,3	X	0,7,0	,6,5	B	L.	3	, ,	M,W	U,R,	, ,	X
,5	, , ,4	X	3,4,3	,2,0	A		2	, ,	S,W	R,F,	, ,	,
,6	, ,4,2	X	3,4,4	,1,8	A	L.	2	, ,	S,W	R,	, ,	,
,7	, ,4,4	X	3,4,4	,1,9	B	CL,	3	, ,	J,W	R,	, ,	,
,8	, ,4,5	X	3,4,2	,1,8	B		2	, ,	S,W	R,F,	, ,	,
,9	, ,4,6	X	1,9,2	,8,2	B	L,R.	3	1,5,	M,W	R,F,	, ,	,
1,0	, 4,8	X	2,5,6	,6,2	B	L,R,	3	, ,	S,W	R,F,	, ,	,
1,1	, ,5,5	X	2,3,0	,9,0	B	L,	3	, ,	S,W	S,P,	, ,	,
1,2	, 5,.5	X	1,9,6	,9,0	A		1	, ,	F,J	S,	, ,	,
1,3	, 5,.6	X	2,4,7	,3,5	B	L,R,.	3	2,0,	M,W	S,	, ,	,
1,4	, 6,.3	X	2,2,0	,8,0	B		1	, ,	F,J	S,	, ,	,
1,5	, ,7,1	X	3,4,6	,1,5	B	L,R,	3	1,8,	M,W	R,	, ,	,
1,6	, ,7,2	X	3,4,5	,1,6	B	L,R,	3	2,7,	M,W	R,	, ,	,
1,7	, ,7,5	X	0,8,0	,7,0	B	L,	3	, ,	M,W	R,R,	, ,	,
1,8	, , ,8	X	2,2,0	,8,0	R		3	, ,	F,J	S,	, ,	,
1,9	, ,8,5	X	1,9,4	,5,2	B		1	, ,	S,W	S,P,	, ,	,
2,0	, ,1,0	X	2,0,0	,6,0	C	L,R,	3	1,6,	M,W	S,P,	, ,	,
2,1	, , , ,	X	2,1,6	,8,6	R	L,R.	3	1,2,	S,W	S,P,	, ,	,
2,2	, 1,0,3	X	3,0,2	,7,2	B	,	3	, ,	S,W	R,P,	, ,	,
2,3	, , 1,1	X	1,7,6	,7,5	B	,	2	, ,	F,J	S,P,	, ,	,
2,4	, 1,0,5	X	2,0,5	,7,6	A	,	2	, ,	F,J	R,	, ,	,
2,5	, , 1,2	X	3,2,0	,2,3	B	L	3	, ,	S,W	R,P,	, ,	,
2,6	, , ,	,	3,1,8	,2,0	B	,	3	, ,	S,W	R,	, ,	,
2,7	, 1,2,1	,	3,1,9	,2,2	B	L	3	, ,	S,W	R,	, ,	,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dsn.	Formatn.	Level	Location
0,1,0,1		5,2,1,2,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7,+,9,7,	3,+,3,2,	0,1,5	±0.0	,1,2		27	

Remarks: 370 - Drift. 07-3-98 ; FOOTWALL

DISCONTINUITY DATA

0,2 Card Type										Identification 570,27;3;2,6			
	Discontinuity					Fltg.				Surface condition			
No.	Distance	Type	Dip Direction	Dip	Con	Type	Unit	Flng. thick. (mm)		Wall	Rough.	Lthlgy.	Hrdn.
2,8	,12,0,2	J,N	2,3,2	,6,6	B	L,R,	4	3.0,		M,W	R,	D,A,T	R,4
2,9	,12,0,5		1,8,5	,8,5	B	L,	3			M,W	R,		
3,0	,13		20,8	,8,8	B		2			F,J	S,P,		
3,1	,14		1,7,5	,7,0	B	L,R,	3	2,2,		S,W	S,		
3,2	,14,6		2,2,3	,8,8	B	L,	3			S,W	S,P,		
3,3	,14,0,6		2,7,0	,5,5	B	L,	3			S,W	R,		
3,4	,15		2,2,5	,8,2	B	L,	3			S,W	S,		
3,5	,15		3,3,7	,1,3	B	L,	3			S,W	R,		
3,6	,15,5		0,0,5	,7,8	B		2			S,W	S,P,		
3,7	,15,8		2,3,6	,7,5	B	W,	2			S,W	R,F,		R,3
3,8	,16		9,1,0	,7,0	A		1			F,J	S,P,		R,4
3,9	,16,5		2,4,3	,7,2	B	L,	3			S,W	S,P,		
4,0	,16,7		2,3,4	,8,5	A		2			S,W	S,P,		
4,1	,17		2,5,0	,4,2	B	R,K,	3			M,W	R,F,		
4,2	,18		1,9,5	,8,5	B	K,	3			M,W	R,W,		R,3
4,3	,19		2,3,8	,8,6	B	L,R,	3	2,7,		M,W	R,F,		R,4
4,4	,19,3		2,6,0	,7,0	A		1			F,J	S,		
4,5	,19,5	F,C	3,1,2	,0,6	B	L,R,	3	5,0,		S,W	R,I,H		R,3
4,6	,20	J,N	2,3,1	,7,6	B	L,	3			S,W	R,I,		R,4
4,7	,20,2		2,4,7	,1,8	A		2			F,J	S,		
4,8	,20,5		3,2,0	,5,8	B	L,	3			S,W	R,		
4,9	,21,5		1,6,8	,8,0	B	L,R,	3	1,0,		S,W	V,R,		
5,0	,23		2,8,0	,5,0	B		2			F,J	R,		
5,1	,23,5	F,C	3,5,7	,7,8	C	L,R,	4	1,6,		M,W	V,R,F		R,3
5,2	,24	J,N	2,4,0	,4,8	B	R,	3	2,2,		S,W	R,F,		
5,3	,24		3,1,0	,2,0	B	R,	3	1,4,		S,W	R,F,		R,4
5,4	,24,0,4		3,1,3	,1,8	B		3			S,W	R,		R,4

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dsn.	Formatn.	Level	Location
0,1	0,1	5,2,1,2,	,	, ,	, , ,	, , ,

Local Grid		Traverse				Kos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+,0,0,	3,+,1,8,7,	0,1,5	±,0.2	. .1,7		2,7	, , ,

Remarks: S70-Drift, 07-3-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type											Identification S70, 0,7,3-9,8			
	Discontinuity				Ins.	Flng.		Ins.	Flng.	Surface condition		Lithlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type			Mnlk. (mm)	Wealth	Rough		
5,5	, ,2,7	J,N	2,9,0	,4,5	B	L	R.	3	, ,	S,W	R, ,	D,A,T	R,4
5,6	, ,2,9	Y	2,9,4	,3,6	B	L	R.	3	1,5,9	M,W	R,F,(1	, ,	, ,
5,7	,3,1,3	, ,	2,4,0	,4,5	B	L	R.	3	, ,	M,W	R, ,	, ,	, ,
5,8	, ,3,3	,	2,4,0	,3,6	B	L	R.	3	3,2,	M,W	R,4,	, ,	, ,
5,9	, ,3,3	,	1,0,6	,8,0	A	L	.	3	, ,	S,W	S,P,	, ,	, ,
6,0	,3,4,0,5	,	2,2,0	,7,0	A		.	2	, ,	F,W	S, ,	, ,	, ,
6,1	, ,3,5	F,L	3,4,0	,2,2	C	L	C.	5	1,0,	M,W	V,R,	, ,	R,3
6,2	,3,5,1,5	J,N	0,2,0	,6,3	B	L	R.	3	, ,	M,W	R,P,	, ,	R,4
6,3	, ,3,6	,	2,9,0	,2,2	B	L	R.	3	1,2,	S,W	S,P,	, ,	, ,
6,4	,3,6,3	,	2,9,2	,2,0	B	L	R,	3	, ,	S,W	S, ,	, ,	, ,
6,5	,3,7,,2	F	2,4,2	,5,5	B	L	R,	2	1,5,	S,W	R,F,	, ,	F
6,6	,3,7,,5	Y	0,1,2	,5,0	A		, ,	1	, ,	F,W	S, ,	, ,	,
6,7	,3,7,,7	F	1,7,2	,6,0	B		R,	3	1,8,	M,W	R, ,	, ,	, ,
6,8	, ,3,8	Y	0,0,6	,5,0	A		L,	3	, ,	S,W	R, ,	, ,	, ,
6,9	,3,8,,3	F	2,3,0	,5,5	B		R,	2	, ,	S,W	R,F,	, ,	, ,
7,0	,3,8,,6	,	3,1,8	,1,8	B	L	R,	3	, ,	S,W	S,P,	, ,	, ,
7,1	,3,9,,1	F	2,7,3	,2,2	B	L	R.	3	19-50	S,W	R, ,	, ,	, ,
7,2	,3,9,,3	F	2,7,0	,2,0	B		L,	3	, ,	S,W	R, ,	, ,	, ,
7,3	,3,9,,4	,	2,7,1	,2,1	B		L,	3	, ,	S,W	R, ,	, ,	, ,
7,4	,3,9,,5	Y	0,2,5	,2,5	B		L,	3	, ,	S,W	R,F,	, ,	R,3
7,5	, ,4,0	F,L	1,7,8	,8,0	C	L	R.	5	, ,	M,W	V,R,	, ,	R,4
7,6	, ,4,1	J,N	1,6,2	,7,6	B		L,	3	, ,	M,W	V,R,	, ,	, ,
7,7	, ,4,2	F	2,2,5	,7,6	B		L,	3	, ,	M,W	R,F,	, ,	, ,
7,8	, ,4,3	F	0,2,4	,6,3	B	L	R,	3	2,1,	S,W	R,F,	, ,	, ,
7,9	,4,3,,5	F	2,2,1	,5,9	B	L	R,	3	1,5,	S,W	R, ,	, ,	, ,
8,0	, ,4,4,1	,	2,2,3	,6,1	B		L,	3	, ,	S,W	R,F,	, ,	, ,
8,1	, ,4,4,2	F	0,3,5	,7,2	B	L	R.	2	1,0,	S,W	R,F,	, ,	, ,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dom.	Formatn.	Level	Location
0,1,0,1	, , , , , , ,	5,2,1,4,	,	, ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+,0,5,	3,+,0,1, ,	0,1,5	±0,0	, ,22		2,7	, , ,

Remarks: S70 - Drift . 07-3-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type									Identification S70,0,7,3,9,8			
	Discontinuity				Qual.	Flng.		Flng. roughness (mm)	Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type			Rough.	Rough.		
8,2	,6,5,5	J,N	2,3,5	,6,4	A	1	3	, ,	S,W	S,P,	D,B,T	R,4
8,3	,4,6,8	"	2,5,0	,3,8	B	Lin.	4	1,7,	S,W	R,	"	"
8,4	,4,7,2	"	3,4,6	,8,5	C	L.	4	, ,	H,W	V,R,S	"	"
8,5	, ,4,8	"	2,2,1	,7,2	B	L,	3	, ,	S,W	R,La	"	"
8,6	, ,4,9	"	3,0,5	,2,5	A	1	1	, ,	F,J	S,P,	"	"
8,7	,4,9,5	"	2,1,1	,8,5	B	L.	3	, ,	S,W	S,L,	"	"
8,8	,5,0,4	"	0,0,3	,2,8	B	L,	4	, ,	H,W	V,R,S	"	"
8,9	, ,5,1	"	0,2,5	,9,0	C	Ls	5	2,3,	H,W	R,	"	"
9,0	, ,5,2	"	2,0,6	,8,8	B	Ro.	2	1,0,	S,W	S,L,	"	"
9,1	,5,2,1	"	1,0,0	,8,8	B	L,	3	, ,	S,W	V,R,	"	"
9,2	,5,3,6	"	0,2,5	,8,0	B	Lo,	2	1,5,	S,W	R,L,	"	"
9,3	,5,4,8	"	1,9,0	,8,2	B	L,	2	, ,	S,W	R,L,	"	"
9,4	, ,5,5	"	1,8,2	,7,7	B	L,	2	, ,	S,W	R,	"	"
9,5	,5,5,5	"	2,2,5	,7,0	C	Ls	5	4,2,	H,W	R,	"	"
9,6	,5,5,8	"	3,0,5	,7,5	A			, ,	F,J	R,	"	"
9,7	,5,5,9	"	3,0,3	,7,7	A		1	, ,	F,J	, ,	"	"
9,8	, ,5,6	"	3,0,4	,7,6	B		1	, ,	F,J	, ,	"	"
9,9	,5,6,5	"	1,9,0	,8,0	B	L,	3	, ,	S,W	R,L,	"	"
1,0,0	,5,7,5	"	2,2,5	,8,5	B	L,	3	, ,	S,W	S,P,	"	"
1,0,1	,5,8,8	"	2,2,0	,8,2	B	Lo,	4	, ,	H,W	R,W,	"	"
1,0,2	,5,9,1	"	2,1,0	,8,0	B	L,	3	, ,	S,W	S,	"	"
1,0,3	, ,6,0	"	2,0,0	,6,5	C	Lo,	5	3,8,	H,W	R,W,	"	"
1,0,4	,6,0,8	"	2,2,6	,7,0	B	L,	3	, ,	S,W	R,L,	"	"
1,0,5	, ,6,2	"	3,3,5	,9,0	B	L,	3	, ,	S,W	V,R,	"	"
1,0,6	,6,2,1	"	3,2,7	,1,5	C	Ro,	3	20-50	H,W	S,P,	"	"
1,0,7	,6,5,5	"	2,2,5	,6,4	B		1	, ,	F,J	S,P,	"	"
1,0,8	, ,6,7	"	1,7,5	,7,2	B	L.	3	, ,	S,	R,W,	"	"

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dec.	Formatn.	Level	Location
0,1,0,1		5,2,1,4,				

Local Grid		Traverse				Kos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+1,0,	2,+8,0,	0,1,5	±0,0	,2,7		27	

Remarks: S70-Drift, 07-3-98 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type

Identification S70 2,7-3-9,8

No.	Distance	Type	Dip Direction	Dip	Bnd	Fing Type	Fing Thick. (mm)	Surface condition Weath.	Surface condition Rough.	Lthlgy.	Hrdn.
10,9	,6,6	JN	1,7,5	,7,2	B	CLAY.	3 1.0,	SW	R,W,	DAT	R,4
11,0	,7,0	T	2,8,5	,7,8	B	CL.	4	HW	R,W,	"	"
11,1	,7,1	T	3,3,0	,8,0	A	CL.	2	SW	S,P,	"	"
11,2	,7,1	T	1,9,0	,9,0	A	CL.	2	SW	S,P,	"	"
11,3	,7,4	T	3,2,0	,1,5	B	CLAY.	3 1.9,	SW	R,W,	"	"
11,4	,7,5	T	2,4,0	,6,0	B	CLAY.	3	HW	R,W,	"	R,3
11,5	,7,6	T	3,3,0	,8,0	C	CL.	4	SW	R,P,	"	R,4
116	,7,7	T	3,0,0	,8,0	B	CL.	3	SW	R,F,	"	"
11,7	7,7,.5	T	2,2,8	,7,5	B	CL.	4	SW	R,	"	"
11,8	,7,8	T	2,2,0	,8,0	B		1	FW	R,W,	"	"
11,9	,7,8,.2	T	2,4,6	,2,7	B	CLAY.	3 2,0,	SW	R,F,	"	"
12,0	,7,9,4	T	2,4,5	,7,5	B	CL.	3	HW	S,P,	"	"
12,1	,8,0	T	2,4,0	,8,0	B	CL.	3	HW	S,	"	"
1 22	,8,0	T	3,3,0	,2,1	C	CLAY.	3 3,0,	SW	S,P,	"	"
123	,8,2	T	2,2,3	,8,0	B	CL.	4	SW	R,F,	"	"
124	,8,2,5	T	1,6,0	,7,5	B	CL.	3	SW	V,R,	"	"
125	,8,3,5	T	2,2,5	,6,4	B	CLAY.	3 2,0,	SW	R,	"	"
126	,8,6	T	2,3,2	,8,5	C	CLAY.	3	HW	V,R,P	"	"
127	,8,6,5	FL	1,6,8	,7,2	C	CLAY.	4 2,5,	HW	V,R,P	"	R,3
128	,8,8	T	1,9,0	,8,8	C	CL.	4	HW	R,F,	"	R,4
130	,8,8,9	T	1,8,0	,7,5	A	CL.	3	SW	R,	"	"
134	,8,9	T	2,0,0	,9,0	B	CL.	3	SW	S,P,	"	"
132	,9,0	T	1,2,0	,5,5	B	CL.	3	SW	R,F,	"	"
133	,9,4	T	1,8,6	,7,6	B	CL.	4	SW	R,F,	"	"
134	,9,4,5	FL	1,6,5	,9,0	D	CLAY.	3	HW	R,	"	R,3
135	,9,5	JN	3,4,0	,7,8	B	CL.	4	HW	R,	"	R,4
							3	SW	R,W,	"	"

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dom.	Formatn.	Level	Location
0,1,0,1	, , , , , ,	52,5,	,	, ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
18,+,8,8,	2+,5,0, ,	0,16	,05	. ,0,6		0,6	, , ,

Remarks: 870-Drift , 07-3-98 ; FOOTWALL

DISCONTINUITY DATA

•,0,2 Card Type										Identification 870, 0,7-3-9,8			
	Discontinuity					Fling				Surface condition		Lthlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Typ			Fling Mitch (mag.	Wealh.	Rough.		
136	, ,9,7	JN	0,0,4	,6,8	B	LK.	4		, ,	Hw	R,U,	DA,T	R,U
137	, ,9,9	F	3,3,2	,2,4	C	GR.	3		2,0,	S,W	R,P,	, ,	,
138	, ,6,0	F	2,1,5	,7,0	B	GR.	3		2,6,	S,W	V,R,C	, ,	F
139	,0,0,1	F	1,6,0	,4,5	B	LC.	3		, ,	S,W	R,U,	, ,	,
140	,0,0,1	F	0,3,6	,8,0	A	VR.	1		1,8,	F,J	R,U,	, ,	,
141	,0,0,3	F	2,3,4	,4,5	B	LC.	2		, ,	S,W	S,P,	, ,	,
,	, , , ,	,	, , ,	, , ,		,	,		, ,	,	, ,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dom.	Formatn.	Level	Location
0,1,0,1		5,2,1,2,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,7,+,9,5,	3,+,2,0,	0,9,3	±,0,1	. ,4,2		2,7	

Remarks: S70 - CROSSCUT 07-3-03 ; FOOTWALL/OREBODY

DISCONTINUITY DATA

*,0,2 Card Type										Identification S70,0,7,3,0,3			
	Discontinuity				Infill	Filling	Thick.	Filling Thick. (mm)	Surface condition		Lithlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type			Wealth	Rough		
,1	,,,0	J,N	2,3,6	,3,0	B	Q,L.	4	1.5 0	H,W	R,S,	D,B,T	R,4
,2	,,,3	V	1,6,2	,7,3	B	K.	4	. .	S,W	V,R,S	~,	R,3
,3	,,3,2	V	1,7,5	,9,0	B	.	1	. .	F,J	R,V,C	~,	R,4
,4	,,,5	V	0,0,5	,8,6	B	G.	4	1,0,	H,W	R,P,	~,	~,
,5	,5,2	V	2,9,8	,3,2	B	Q.	3	8. ,	S,W	S, ,	~,	~,
,6	,6,5	F,L	2,1,1	,7,3	B	L.	3	. .	H,W	R,P,	~,	R,3
,7	,,,8	F,L	3,5,3	,7,1	B	C,L.	4	. .	H,W	R,P,	~,	~,
,8	,8,3	J,N	3,7,3	,5,3	B	L.	4	. .	H,W	R, ,	~,	R,4
,9	,,,1	V	2,1,0	,7,0	B	L.	3	. .	S,W	R, ,	OREBODY	
1,0	,11,8	F,L	3,0,3	,8,0	B	L,	4	. .	H,W	R,P,	D,B,T	R,3
1,1	,,1,5	V	1,7,5	,6,6	B	L,	3	. .	S,W	R, ,	~,	R,4
1,2	,15,3	V	2,9,5	,3,2	B	L,R,	4	8,0,	H,W	R, ,	~,	~,
1,3	,15,7	V	3,2,6	,5,0	B	L	3	. .	S,W	S,P,	~,	~,
1,4	,,1,6	V	2,2,7	,6,3	A	L,	3	. .	S,W	R, ,	~,	~,
1,5	,17,2	V	3,2,0	,7,0	B	L,	3	. .	S,W	R, ,	~,	~,
1,6	,18,2	V	1,6,2	,7,0	B	L,	3	. .	S,W	R,F,	~,	~,
1,7	,,2,0	V	1,9,0	,8,2	B	L.	3	. .	S,W	S,P,	~,	~,
1,8	,,2,5	F,L	1,3,5	,5,3		G,	4	4,0,0	C,W	R,P,	~,	R,3
1,9	,,2,9	J,N	1,6,0	,8,0	B	L,	4	. .	H,W	R, ,	~,	R,4
2,0	,,3,0	V	1,6,2	,7,5	C	L,	3	. .	H,W	R, ,	~,	~,
2,1	,,3,2	F,L	1,2,8	,7,0	C	G.	4	. .	C,W	R,P,	~,	R,3
2,2	,,3,5	J,N	1,5,5	,5,6	B	L,	3	. .	H,W	R,F,	~,	~,
2,3	,,3,6	V	3,1,1	,3,0	B	Q,	3	3,0,	H,W	R,F,	~,	~,
2,4	,,3,8	V	1,5,5	,7,0	B	L,	3	. .	H,W	R, ,	~,	~,
2,5	,38,3	V	2,3,0	,6,7	A	L,	3	. .	H,W	R,F,	~,	~,
2,6	,,4,0	V	1,5,5	,4,6	A	L,	3	. .	S,W	R, ,	~,	~,
2,7	,,4,2	V	1,0,5	,8,5	B	L.	3	. .	H,W	R, ,	~,	~,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dec.	Formatn.	Level	Location
0,1,0,1		52,1.3				

Local Grid		Traverse				Kos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,7,+5,3,	3+,1,5,	0,9,6	+0.0				

Remarks: 870-CROSSCUT ; 07-3-03 ; OREBODY

DISCONTINUITY DATA

*,0,2 Card Type											Identification 570,07+3-03			
No.	Discontinuity Distance	Type	Dip Direction	Dip	Sym.	Fing. Type	Fing. Thick.	Fing. mark. (mm)	Surface condition Wall	Surface condition Rough	Lithlgy.	Hrdn.
2,8	42,1	JN	94,0	53	B	CR.	4	12,	M,W	R,	DA,T	R,4
2,9	4,3	F	2,3,0	80	B	CR.	3	1.8.	HW	WR,		
3,0	4,3	F	0,5,0	82	B	L.	3		M,W	WR,		
3,1	4,4	F	1,6,0	58	B	L.	3		M,W	R,F,		
3,2	4,5	F	1,6,5	80	A	L.	3		S,W	R,		
3,3	4,7	F	1,8,0	90	B	CR.	4	8.	M,W	R,G		
3,4	4,8	F	0,5,5	90	B	L.	5		M,W	R,F,		
3,5		F	3,5,0	36	B	L.	3		M,W	R,		
3,6		F	2,4,0	60	B	L.	3		M,W	S,P,		
3,7		F	3,0,0	62	B	L.	3		M,W	R,P,		
3,8		F	2,8,0	60	B	L.	3		M,W	S,P,		
3,9		F	9,6,7	63	B	L.	3		M,W	S,P,		
4,0		F	3,4,0	20	B	L.	4		M,W	R,		
4,1		F	05,0	63	B	L.	3		M,W	R,		
4,2		F	2,54	50	B	L.	3		M,W	R,W,		
4,3		F	0,1,0	80	B	L.	3		M,W	R,		
4,4		F	1,3,0	76	B	L.	3		M,W	R,V,F		
4,5		F	0,7,0	75	B	L.	3		M,W	R,V,F		

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dec.	Formatn.	Level	Location
0,1,0,1		5,2,1,4,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,8,+5,3,	2,+6,5,	1,1,0	+0,0	,1,3		2,7	

Remarks: 570-CROSSCUT, 07-3-05 ; FOOTWALL

DISCONTINUITY DATA

*,0,2 Card Type											Identification 570,07;3-05			
	Discontinuity				Strength	Fling		Fling Thickness (mm)	Surface condition		Lithlgy.	Hrdn.
No.	Distance	Type	Dip Direction	Dip		Type			Wealth	Rough		
,1	,,,0	JN	2,0,7	,6,7	A	L.		3	,,	S,W	R,,	DAT	R,4
,2	,,0,8	J	2,0,4	,6,0	B	,.		3	,,	S,W	R,,	,~,	~,
,3	,,,1	J	2,0,5	,6,7	B	L.		3	,,	S,W	V,R,4	,~,	~,
,4	,,2,4	J	3,3,6	,9,0	B	L.		3	,,	S,W	R,F,	,~,	~,
,5	,,2,8	J	2,8,0	,5,0	B	L.		3	,,	S,W	P,,	,~,	~,
,6	,,3,5	J	2,8,0	,6,7	B	L.		3	,,	S,W	S,P,	,~,	Y
,7	,,4,7	~	1,5,2	,8,0	B	L.		3	,,	S,W	P,,	,~,	Y
,8	,,,5	Y	1,4,5	,5,0	B	L.		3	,,	S,W	S,P,	,~,	~,
,9	,,5,7	J	2,1,0	,6,7	A	L.		3	,,	S,W	S,P,	,~,	~,
1,0	,,5,8	C	2,1,8	,2,5	B	L,		3	,,	M,W	R,F,	,~,	~,
1,1	,,,6	F	3,3,0	,1,5	B	L,Q,		3	3,5,	S,W	S,P,	,~,	Y
1,2	,,6,3	J	3,2,6	,1,7	B			3	,,	S,W	S,	,~,	~,
1,3	,,,7	J	2,0,1	,7,0	B	L,		4	,,	M,W	R,W,	,~,	~,
1,4	,,,8	J	0,6,0	,9,0	A	L,		3	,,	M,W	V,R,F	,~,	~,
1,5	,,8,6	~	3,3,0	,8,5	B	L,		5	,,	M,W	V,R,	,~,	~,
1,6	,,,9	FL	2,2,0	,5,4	C	L,G,		5	1,1,	C,W	R,,	,~,	R,2
1,7	,,9,2	SM	2,9,0	,2,8	B	L,Q,		3	1,8,	M,W	R,,	,~,	R,4
1,8	,,9,5	J	1,4,7	,8,0	B	L,		3	,,	M,W	R,,	,~,	~,
1,9	,,,10	J	2,0,4	,6,7	B	L,W,		4	,,	M,W	R,,	,~,	R,3
2,0	,,,10	J	0,8,0	,7,5	B	L,		3	,,	M,W	R,P,	,~,	R,4
2,1	,,10,5	J	2,1,5	,7,2	B	K.		4	,,	M,W	S,F,	,~,	R,3
2,2	,,,41	J	2,0,0	,6,5	B	L,W,		4	,,	M,W	S,F,	,~,	Y
2,3	,,40,8	J	3,2,5	,8,5	A	L,R,		3	1,5,	M,W	R,,	,~,	Y
2,4	,,,41	J	0,0,3	,9,0	B	L,W,		4	,,	M,W	V,R,	,~,	R,3
2,5	,,40,5	J	3,5,6	,8,5	B	L,		3	,,	M,W	R,,	,~,	R,4
2,6	,,,42	F	0,2,8	,8,0	C	L,W,		4	,,	M,W	R,,	,~,	R,4
2,7	,,43,3	FL	1,4,5	,7,5	B	L,W.		4	,,	M,W	R,P,	,~,	R,3

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dec.	Formatn.	Level	Location
0,1,0,1	, , , , , , ,	5,2,1,4,	,	, , ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,7+9,0,	2,+8,0, ,	1,1,0	+,0,1	,4,7		2,7	, , ,

Remarks: S70-CROSSCUT 07-3-05 ; FOOTWALL/OREBODY

DISCONTINUITY DATA

,0,2 Card Type										Identification S70 07-3-05			
	Discontinuity					Fling				Surface condition			
No.	Distance	Type	Dip Direction	Dip	Sense	Type	Sense	Fling Thickness (mm)		Weath.	Rough.	Lthlgy.	Hrdn.
2,8	,1,3,4	J,N	2,9,2	,2,0	B	L/R.		3	5.	M,W	S,	D,A,T	R,4
2,9	,13,5	Y	2,9,3	,1,8	B			3		M,W	S,	~,	~,
3,0	,1,4,7	Y	3,4,5	,8,3	B	L.		3		M,W	S,P,	~,	~,
3,1	, ,1,5	F	2,0,5	,7,2	B	L.		3		M,W	S,E,	~,	~,
3,2	, ,1,6	~	3,4,7	,1,5	A	L/R.		3	12,	M,W	R,E,	~,	~,
3,3	,16,5	Y	2,1,0	,6,5	B	L.		4		M,W	R,E,	~,	~,
3,4	,17,5	Y	1,9,2	,7,8	B	L/R.		4		M,W	R,	~,	~,
3,5	, ,1,8	Y	3,5,0	,7,6	B	L/R.		4		M,W	R,E,	~,	~,
3,6	, ,1,9	Y	2,0,0	,8,0	B	K.		4		M,W	V,R,E	~,	~,
3,7	,19,5	Y	3,4,5	,8,0	B	L/R,		3		M,W	R,E,	OREBODY	
3,8	, ,2,0	F,L	1,4,5	,6,0	B	L/R,		5		M,W	R,P,	D,A,T	R,3
3,9	, ,2,1	J,N	1,3,5	,4,6	B	L/R,		5		M,W	V,R,E	~,	R,4
4,0	, ,2,2	F,L	1,3,0	,5,0		L	R,K	5	2,5,0	C,W	R,P,	~,	R,2
4,1	, ,2,9	F,L	1,6,5	,8,0	C	L	R,	5		C,W	R,P,	~,	R,3
4,2	, ,3,3	J,N	0,6,5	,7,8	B			3		M,W	R,	~,	R,4
4,3	, ,3,5	Y	1,9,5	,7,0	B	L/R,		4		M,W	S,U,	~,	~,
4,4	, ,3,8	~	1,6,7	,8,0	A	L,		4		M,W	V,R,	~,	~,
4,5	, ,4,0	F,L	1,4,5	,4,6	D	G,		5	2,6,0	M,W	R,	~,	~,
4,6	, ,4,3	J,N	0,7,2	,9,0	B			4		C,W	R,P,	~,	R,3
4,7	, ,4,7	Y	0,8,0	,9,0	B	L,		4		M,W	V,R,E	~,	R,4
4,8	,47,5	Y	3,4,0	,8,5	B			3		S,W	V,R,	~,	~,
4,9	, ,4,9	Y	0,6,7	,7,0	B			3		S,W	V,R,	~,	~,
5,0	, ,5,1	Y	9,3,2	,8,5	B			4		M,W	R,E,	~,	~,
5,1	, ,5,2	Y	1,9,0	,7,8	B			3		M,W	V,R,E	~,	~,
5,2	,52,4	Y	1,8,7	,7,6	B			4		M,W	V,R,	~,	~,
5,3	,52,8	Y	1,9,2	,7,7	B			3		M,W	R,	~,	~,
5,4	, ,6,0	Y	1,9,8	,8,0	B	K.		3		M,W	R,E,	~,	~,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation ±	Dam.	Formatn.	Level	Location
0,1,0,1	, , , , , ,	5,2,1.6	,	, ,	, , ,	, , ,

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7,+45,	2,+6,9,.5	1,1,0	±0.0	. . .		3,0	, , ,

Remarks: 370- CROSSCUT 07-3-05 , OREBODY

DISCONTINUITY DATA

*,0,2 Card Type — Identification 370,07-3-05

No.	Discontinuity: Distance	Type	Dip Direction	Dip	Dam.	Eling. Type	Eling. Dist.	Eling. Thickn. (mm).	Surface condition: Weath.	Surface condition: Rough.	Lthlgy.	Hrdn.
5,5	,62	JN	2,0,5	,60	B	K.	5	, ,	H,W	R,I,	D,A,T	R,3
5,6	,65	FL	0,5,0	,70	D	KIG.	5	2 C.0	C,W	VR,F	~,	R,3
5,7	,66	JN	0,6,0	,90	B	.	3	, ,	M,W	S,P,	~,	R,4
5,8	,66	X	1,4,2	,67	B	.	3	, ,	M,W	S,P,	~,	~
5,9	,67	X	1,4,0	,66	A	L.	3	, ,	C,W	VR,F	~,	~
6,0	,67,3	X	3,5,0	,30	A	L.	2	, ,	S,W	SP,	~,	~
6,1	,70	X	2,0,0	,80	B	K.	3	, ,	H,W	R,I,	~,	R,3
6,2	,79.2	X	1,2,5	,67	B	L.	4	, ,	H,W	R,	~,	R,3
6,3	,71	FL	1,9,5	,65	C	K.	5	, ,	C,W	R,	~,	R,3
6,4	,73	JN	1,6,0	,80	B	.	3	, ,	M,W	R,I,	~,	R,3
6,5	,74	X	1,6,0	,80	B	K,	3	, ,	C,W	VR,	~,	R,3
6,6	,75	X	2,1,0	,86	B	K.	4	, ,	C,W	VR,	~,	R,4
6,7	,77	X	1,0,5	,76	B	L R,	3	8,0	M,W	S,P,	~,	R,4
6,8	,79	X	3,4,5	,35	B	.	2	, ,	S,W	R,U,	~,	X
6,9	,79,6	X	1,1,0	,80	B	.	3	, ,	S,W	S,P,	~,	~
7,0	,	X	1,6,0	,70	B	L,	3	, ,	H,W	R,	~,	~
7,1	,	X	0,6,0	,50	B	.	3	, ,	M,W	R,I,	~,	~
7,2	,	X	0,0,0	,60	A	L,	3	, ,	S,W	R,	~,	~
7,3	,	X	2,4,0	,62	A	.	3	, ,	S,W	R,	~,	X
7,4	,	X	1,5,0	,68	B	L,	3	, ,	M,W	VR,	~,	X
7,5	,	X	3,1,0	,52	B	.	3	, ,	M,W	VR,F	~,	X
7,6	,	X	1,3,5	,90	B	L.	3	, ,	M,W	R,I,	~,	~
7,7	,	X	2,6,0	,43	B	.	3	, ,	M,W	R,I,	~,	~
7,8	,	FL	1,2,8	,66	C	G,	4	2,0,	H,W	VR,	~,	R,3
7,9	,	JN	3,1,0	,45	B	.	3	, ,	M,W	R,I,	~,	X
8,0	,	X	2,4,0	,80	B	.	3	, ,	M,W	R,I,R,	~,	~
8,1	,	X	1,8,0	,90	B	.	3	, ,	M,W	VR,F	~,	~
82		•	320	20	A	L	3		SW	VRF	~	•
83		•	056	90	B		2		MW	VR	•	•
84	↓	"	318	46	B		2		MW	SP	•	•

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dtm.	Formatn.	Level	Location
0,1,0,1		52/,5,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc.	Obs.	Direction
1,8,+1,8,	2,+3,3,	1,1,0	±0.0	. .35		27	

Remarks: S70-CROSSCUT, 07-3-07 ; FOOTWALL/OREBODY

DISCONTINUITY DATA

*,0,2 Card Type Identification S70,0,7;3-0,7

No.	Discontinuity: Distance	Type	Dip Direction	Dip	Sc. Int.	Fling: Type	Fling: Int.	Fling Thick. (mm)	Surface condition: Weath.	Surface condition: Rough.	Lthlgy.	Hrdn.
,1	,,,0	J,N	2,0,1	,7,8	B	R L.	3	,,	S,W	V,R,	D,A,T	R,4
,2	,,,1	Y	3,1,1	,2,1	B	L R.	3	3.2.	S,W	R,U,	,~,	~,
,3	,,1,3	J	3,5,0	,2,5	B	L R.	3	4,0,	S,W	R,I,	,~,	~,
,4	,,3,5	Y	2,1,0	,5,0	B	L.	3	,,	M,W	R,U,	,~,	~,
,5	,,,5	Y	2,5,0	,3,9	A	L.	3	,,	S,W	S,I,	,~,	~,
,6	,,,6	Y	2,5,2	,7,0	A	L.	3	,,	S,W	S,I,	,~,	~,
,7	,,6,3	Y	1,3,0	,5,0	B	L.	3	,,	S,W	R,	,~,	~,
,8	,,,7	Y	2,4,0	,7,0	A	L.	3	,,	S,W	R,	,~,	~,
,9	,,,8	F,L	0,0,8	,6,5	C	G.	5	1.5,	C,W	R,P,	,~,	R,4
1,0	,,9,5	J,N	2,2,5	,8,5	B	L G,	4	1,0,	C,W	R,	,~,	~,
1,1	,,1,0	F,L	2,1,0	,7,6	B	,	4	,,	C,W	R,	,~,	R,3
1,2	,,10,5	J,N	0,0,5	,2,5	B	L R.	3	1,5,	S,W	R,	,~,	R,4
1,3	,,,11	F,L	1,8,0	,6,0	B	L G,	5	2,0,	C,W	R,	OREBODY	
1,4	,,12,5	J,N	1,7,6	,5,3	B	L C,	4	5,	H,W	R,F,	D,A,T	R,4
1,5	,,,14	Y	1,6,0	,5,0	B	G,	4	1,0,	H,W	R,F,	~,	Y
1,6	,,,14	Y	3,2,0	,6,5	A	,	3	,,	S,W	S,P,	,~,	~,
1,7	,,15,3	Y	1,9,0	,6,3	B	L.	3	,,	H,W	V,R,	,~,	~,
1,8	,,,16	F,L	1,4,0	,5,0		G,	5	8,0,	C,W	R,P,	,~,	R,3-4
1,9	,,,17	F,L	1,3,5	,5,0	D	,	4	,,	C,W	R,P,	,~,	R,3
2,0	,,,20	J,N	2,9,0	,2,0	B	L,	3	,,	M,W	R,U,	,~,	R,4
2,1	,,,21	Y	3,0,5	,7,2	B	L,	2	,,	M,W	S,P,	,~,	~,
2,2	,,,22	Y	0,3,0	,9,0	B	L,	4	,,	M,W	V,R,	,~,	~,
2,3	,,,27	Y	2,3,0	,7,5	A	L,	3	,,	M,W	R,	,~,	~,
2,4	,,,27	Y	1,0,5	,7,0	B	L,	3	,,	M,W	R,	,~,	~,
2,5	,,,28	Y	1,7,0	,7,8	B	L,	4	,,	M,W	V,R,	,~,	~,
26	,,31,5	Y	2,2,7	,7,6	B	,	3	,,	M,W	V,R,	,~,	~,
2,7	,,35,5	Y	1,8,5	,7,8	B	K.	3	,,	H,W	R,I,	,~,	~,

LINE MAPPING SHEET

TRAVERSE LINE

Card Type	Identification	Elevation	Dan.	Formatn.	Level	Location
0,1,0,1		5,2,1,5,				

Local Grid		Traverse				Nos.	Reference
Northing	Easting	Trend	Plunge	Length	Sc	Obs.	Direction
1,7,+,6,5,	2,+,2,0,	1,1,8	+,0.0	,2,5		1,7	

Remarks: S70-CROSSCUT · 07-3-07 ; OREBODY

DISCONTINUITY DATA

*,0,2 Card Type										Identification S70 0,7-3-0,7			
No.	Discontinuity Distance	Type	Dip Direction	Dip	Dis Ins	Fling Type	Fling Sc	Fling Thick. (mm).	Surface condition Weath.	Surface condition Rough.	Lthlgy.	Hrdn.
2,8	,3,8	J,N	3,4,5	,5,0	B	K.	4	. .	H,W	R,S,	D,A,T	R,4
2,9	,3,8.,5	T	1,9,0	,6,0	B	K.	4	. .	H,W	R,C,	"	"
3,0	,3,9	"	3,3,0	,4,5	A	2.	3	8.	S,W	V,R,S	"	"
3,1	,4,1	"	1,6,0	,2,8	B	.	3	. .	S,W	R,S,	"	"
3,2	,4,1.,3	"	1,4,6	,8,6	B	.	3	. .	S,W	V,R,S	"	"
3,3	,4,5	T	2,7,0	,8,0	R	L.	3	. .	S,W	V,R,	"	"
3,4	,4,6	T	1,4,5	,5,0	B	.	3	. .	S,W	R,	"	"
3,5	,4,6.,3	T	1,4,3	,5,3	B	L.	3	. .	M,W	V,R,	"	T
3,6	,4,7	T	2,0,0	,8,2	B	L.	4	. .	S,W	R,	"	"
3,7	,4,9	F,L	0,6,5	,7,0	C	K.	5	. .	H,W	V,R,P	"	R~3
3,8	,5,3	F,L	0,6,7	,5,0	C	6	5	1,2,	C,W	R,S,	"	R,3
3,9	,5,5	J,N	2,3,5	,7,0	B	L.	4	. .	M,W	R,C,	"	R,4
4,0	,6,2	T	3,0,5	,7,8	B	L.	3	. .	M,W	V,R,	"	"
4,1	,6,4	"	3,0,8	,7,9	B	L.	3	. .	M,W	R,S,	"	"
4,2	,6,5	"	3,2,0	,2,5	A	L4.		. .	M,W	V,R,	"	R,3
4,3	,6,6	"	1,7,5	,7,0	B	L.		. .	H,W	R,W,	"	R,4
4,4	,1,0	"	2,5,5	,6,7	B	K.		. .	M,W	R,S,	"	"

POOR

QUALITY

ORIGINAL